

# NETWORK WORLD

The Newsweekly of Enterprise Network Strategies

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## Cisco boosts token-ring performance

By Maureen Molloy  
Senior Writer

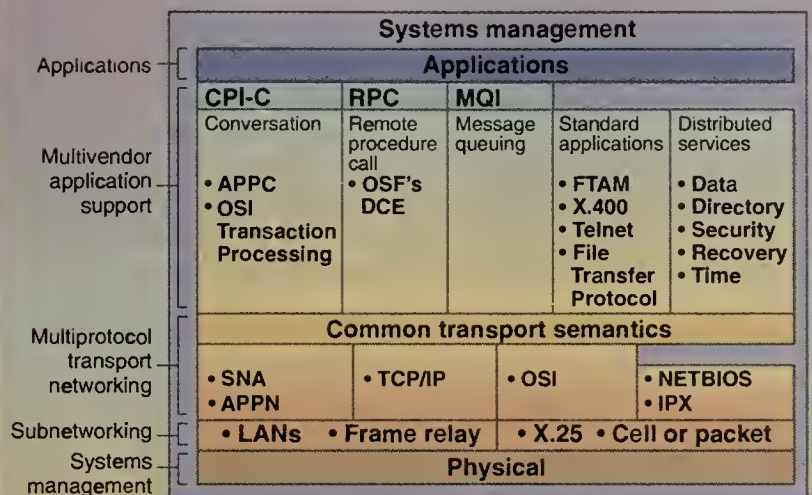
MENLO PARK, Calif. — Cisco Systems, Inc. last week announced the industry's first four-port bridge/router token-ring interface card, a board that offers nearly twice the packet forwarding rate of most competing products.

The Multiport Token Ring Card works with Cisco's high-end AGS+ bridge/router and has a packet forwarding rate in excess of 25,000 packet/sec, according to LANQuest Labs, a network testing and consulting firm in San Jose, Calif., that tested the new module. The product will enable users to connect up to 16 token-ring local-area networks to a single AGS+, up from the previous limit of eight.

"The higher performance and larger number of ports on the card will allow users to support multiple token-ring LANs in the box without any real degradation in throughput," said Bob Buchanan, LANQuest vice-president and general manager. "Cisco's is the first [token-ring card] we've seen

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## IBM's Networking Blueprint



CPI-C = Common Programming Interface for Communications  
MQI = Message queuing Interface  
OSF's DCE = Open Software Foundation, Inc.'s Distributed Computing Environment

Richard McGee, IBM's manager of Networking Systems Architecture, formulated the company's Networking Blueprint, which provides a concise representation of IBM's new modular, multiprotocol networking scheme.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: IBM, RESEARCH TRIANGLE PARK, N.C.

## IBM exec maps out path leading to the 'new' SNA

**Q&A** In the 1950s, Thomas Watson Jr. responded to market conditions and transitioned his father's office-equipment business from punch card tabulating machines to vacuum-tube computers.

Today, IBM is confronted by perhaps its greatest competitive challenge since those punch card days: multivendor distributed-computing.

In this predatory climate,

Richard McGee, IBM's manager of Networking Systems Architecture, finds himself playing a key role in his company's move toward a more viable networking architecture.

Steven S. King, a freelance writer and consultant based in Tucson, Ariz., talked with McGee about the emerging network environment in this special *Network World* report.

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## IBM separates FEP facts from fiction

Will off-load processing functions to adapters; no plans for wholesale hardware, software upgrades.

By Michael Cooney  
Senior Editor

LA GAUDE, France — Faced with the demand for higher speeds and competition from emerging internetwork products, IBM last week outlined how it intends to make its 3745 front-end processor (FEP) the linchpin in customers' multivendor nets.

In the coming year, the company will increase overall performance of the 3745 Communication Controller by off-loading much of its central processor work load onto new high-performance FEP adapter boards. IBM will also roll out enhancements to the box's Network Control Program (NCP) software and add support for more protocols.

In a wide-ranging interview with *Network World*, IBM's Jean Lorrain, senior staff member of IBM's lab here, spelled out 3745 product directions and exploded a few myths.

"We are not going to replace the 3745 with another box," Lorrain said. "There has been talk of a 3765 or something, but that is

definitely not going to happen."

Instead of forcing revolutionary change in 3745-based nets, IBM will enable existing nets and applications to take advantage of

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### FEATURES



Break out the champagne! Intelligent nets graduate magna cum laude. Page 34.

## User learns tough lesson in contracts

By Joanne Cummings  
Senior Writer

SAN DIEGO — When John Smith got to work last Wednesday, he discovered the application used to manage his corporation's entire operation had frozen up solid, and there was nothing he could do about it.

Smith had been embroiled in a payment dispute with the vendor of the software, and in retaliation, the vendor dialed in through a remote maintenance port and locked up the system. When confronted, the company's president said it was common practice as a last resort to extract payment.

Smith is now exploring the legality of the vendor's actions and his own recourse with several

(continued on page 5)

## Novell to unveil MHS 2.0, ship global message server

By Timothy O'Brien  
West Coast Bureau Chief

SAN JOSE, Calif. — In a bid to bolster its position in the competitive messaging marketplace, Novell, Inc. is expected to announce today a new version of its Message Handling Service (MHS) as well as the availability of its NetWare Global Messaging server.

With NetWare MHS Version 2.0 designed for small businesses, work groups and departments, and NetWare Global Messaging serving as more of an enterprisewide messaging integration platform, Novell is positioned to address the needs of a wide customer base.

"We now provide a complete messaging server integration

platform with Global Messaging, as well as MHS for those customers who don't need that much power," said Carey Heckman, director of messaging products marketing.

NetWare Global Messaging, which was announced in March, is a messaging engine based on NetWare Loadable Modules that can interact with other types of electronic mail systems.

By contrast, MHS is an entry-level messaging engine that can receive, route, transport and deliver text or data to mail-enabled applications that support its programming interface.

Compared to a minor maintenance release of MHS that came

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### NETLINE



**NOVELL'S V.2.0 ROUTER** adds support for more protocols, other features. Page 2.

**CARRIERS FRET** over which high-bandwidth technology to invest in. Page 2.

**MAC SHOW TO HIGHLIGHT** net products. Page 2.

**PACBELL READINGY** Open-View-based local-area network

management service. Page 4.

**BATTLES BREWING** over who controls internets, distributed environments. Page 4.

**START-UP TO OFFER** LAN interface for frame relay, SMDS links. Page 4.

**NEW TELEOS LINE** gives remote users less expensive access to LANs. Page 5.

# Novell targets remote LAN users with upgraded router

NLM improves mgmt. and security in addition to adding protocol support, integrated hub functions.

By Maureen Molloy  
Senior Writer

SAN JOSE, Calif. — Novell, Inc. will announce today an enhanced version of its PC-based router that adds support for multiple wide-area network protocols, integrated hub capabilities and other new features.

Like the earlier product, NetWare MultiProtocol Router Version 2.0 is a NetWare Loadable Module (NLM) that provides users with a low-cost alternative to routers based on proprietary hardware platforms.

Targeted at remote and departmental local-area network

users, Novell is positioning V.2.0 as a feeder device for LAN internets based on high-end backbone routers such as Cisco Systems, Inc.'s AGS+ and Wellfleet Communications, Inc.'s Backbone Node.

Among the key enhancements in V.2.0 are easier installation and configuration of the router, improved management and security capabilities, additional protocol support and integrated hub functions.

The multiprotocol router software runs on any Intel Corp. 386- or 486-based personal computer.

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# Carriers guarded about market for new technology

Say business, not technical, questions persist.

By Ellen Messmer  
Washington Correspondent

WASHINGTON, D.C. — Local and long-distance carriers last week admitted they are uncertain about the market demand for frame relay, Switched Multimegabit Data Service (SMDS) and Asynchronous Transfer Mode (ATM).

At the Gigabit Networks conference here, AT&T, MCI Communications Corp. and Nynex Corp. agreed that the profusion of new technologies has created confusion and made network investment decisions difficult.

Solving the technical ques-

tions associated with high-speed networking is a small problem compared to identifying the right technology in which to invest, several speakers said. "The technology is not the challenge," said Ronald Toth, product manager of AT&T business services. "It's the business issue."

Walter Johnston, executive director of data and information services with Nynex Science & Technology, said, "More high-speed data services will be introduced in the next three years than during the past 10." He pointed out that there is little understand-

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# Business suits, tie-dyed T's meet at MacWorld Expo

By Margie Wylie  
Senior Editor

BOSTON — Sandals and tie-dyed T-shirts aren't yet rare at MacWorld Expo, but the number of suits showing at the Macintosh trade show here this week just goes to show that "the computer for the rest of us" is moving closer to the corporate mainstream and deeper into its networks.

Amid the colorful cacophony, users will find several new products dedicated to connecting Apple Computer, Inc.'s Macintoshes to each other and to the rest of the network.

Cayman Systems, Inc. of Cam-

bridge, Mass., will unveil a server that lets users dial into AppleTalk networks while offering managers the peace of mind of high security and the economy of multiple simultaneous connections.

The \$1,899 GatorLink is the first remote server for Macintoshes that will let as many as three users simultaneously connect to an EtherTalk network via Apple's \$149 AppleTalk Remote Access software. (AppleTalk Remote Access ships free with PowerBook Macintoshes.)

Due in September, GatorLink will also support Security Dynam-

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## Briefs

**ATM chips on horizon.** National Semiconductor Corp. last week said it will license Asynchronous Transfer Mode (ATM) technology from Adaptive Corp. to make ATM chipsets for local-area networks. National Semiconductor will obtain from Adaptive cell fragmentation and reassembly technology, which packages data into 53-byte ATM cells. National Semiconductor will unveil its first ATM chipsets in the first half of 1993. The financial terms of the deal were not disclosed.

**Fax about IBM.** IBM last week announced a facsimile service that will enable customers to retrieve product and service information around the clock. The IBM Fax Information Service, accessed by dialing (800) 426-4329, guides callers through a voice menu to select the information needed. Once the selection is made, callers key in their fax numbers and hang up. The request is processed and the information is faxed. As many as five documents, such as product data sheets and customer case studies, can be retrieved at once.

**Big Apple to gain new safety net.** NCR Corp. last week said it constructed a disaster recovery center in Rochelle Park, N.J., to provide backup computing and data communications facilities for companies in the metropolitan New York area.

The 300,000-sq.-ft. facility is equipped with 200 end-user workstations, computer systems and voice and data communications capabilities, and is designed to be inhabited within two to four hours after a disaster.

**Saddam tactics?** The National Association of Regulatory Utility Commissioners (NARUC) last week released a report outlining difficulties it is encountering in its attempt to perform a nationwide audit of the regional Bell holding companies to determine if there have been any cross-subsidy violations. NARUC asserts that the RBHCs are intent on slowing down the audit and, in some cases, they appear determined to destroy the effort to examine RBHC records.

**Long haulers boast new service contracts.** MCI Communications Corp. last week announced that Corning, Inc., Inland Steel Co., Quaker Oats Co. and Whitman Corp. have all selected the carrier for long-distance service. Separately, AT&T filed two more custom contract deals with the Federal Communications Commission for unnamed customers, bringing the total number of such deals to 20.

**DEC picks Chipcom for role in Navy deal.** Chipcom Corp.'s ONline System Concentrator has been selected by Digital Equipment Corp. for use in a U.S. Navy local-area network contract. Under the Navy personal computer LAN project, DEC is providing equipment and services to integrate LANs for the Navy, the U.S. Department of Defense and the Federal Bureau of Investigation. All of Chipcom's Online Ethernet, token-ring and internetworking products are now available under the contract.

**IBM to offer panoramic view.** On Tuesday, IBM executives will give the big picture in New York concerning the company's Advanced Peer-to-Peer Networking, Transmission Control Protocol/Internet Protocol and Open Systems Interconnection strategies. The open networking briefing will feature demonstrations of IBM's multivendor product offerings and a case study of Nomura Securities Co., Ltd., which is looking to utilize these products.

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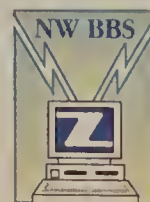
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# TORCHED BY TOKEN RING ?

life  
before



life  
after



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USA & Canada (214) 234-6400  
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# PacBell offers LAN mgmt. service based on OpenView

Will help users in cutting costs or outsourcing.

By Bob Brown  
Senior Editor

SAN RAMON, Calif. — Pacific Bell is readying a service based on Hewlett-Packard Co.'s OpenView integrated net management system with which it will manage LAN internetworks and help desks on behalf of users. *Network World* has learned.

Pacific Bell's Data Communications Group is rolling out the service to address users' physical and logical net management needs as they face budget cutbacks and staffing shortages. The as yet unnamed service is also targeted at users who prefer to outsource management chores so they can focus on other tasks.

"There is a lack of skills and resources for managing distributed LANs, and acquiring integrated management tools is difficult [and] expensive," said Sam Mathan, executive director of network integration at Pacific Bell's Data Communications Group. "These are problems we are trying to solve with our LAN management service."

Pacific Bell plans to publicly demonstrate the service for the first time at INTEROP 92 Fall in San Francisco this October.

The new service is part of a program launched last year by

the Data Communications Group to address the local-area network and internetwork markets — areas in which carriers have traditionally been weak. To get the effort rolling, the group has introduced high-speed switched services and partnered with third-party equipment vendors.

The LAN management service will be offered in multiple iterations based not only on OpenView, but also on Remedy Corp.'s Action Request System, which is a trouble-ticket application, and ISICAD, Inc.'s Command 5000 software, which the company refers to as a physical connectivity management system.

Pacific Bell will use a new product jointly developed by Remedy and ISICAD, dubbed Command Helpdesk, that links Command 5000 and the Action Request System via application program interfaces, said George Christensen, a product manager at ISICAD. That product is expected to be unveiled this week.

Pacific Bell plans to run the management software from one or more LAN management centers and use its network to tie into user nets, Mathan said.

The software packages have been integrated to perform their jobs in a synchronized fashion,

according to Mathan.

HP's OpenView collects alert data from Simple Network Management Protocol agents residing on network devices such as routers, wiring hubs and adapter cards. Remedy's software, which runs as an application atop OpenView, uses OpenView problem data to open trouble tickets. ISICAD's Command 5000 software, which runs as a peer to OpenView on either the same or a different workstation, provides circuit trace data and an asset portfolio consisting of details about the troubled device, including its make and manufacturer.

With that combination of products, Pacific Bell staff at the LAN management center can fix problems remotely or dispatch a technician to a user's site. Users will have the option of complementing the Pacific Bell service by installing monitors at their own sites to view net status.

HP, ISICAD and Remedy have discussed offering services similar to Pacific Bell's with other carriers, but a formal announcement is far from ready.

Pacific Bell began testing the service with customers about a year ago and now has about 35 customers using it at 89 sites. Mathan declined to name any of those customers.

The service, to be sold on a contract basis, is being marketed initially to users in the government, education and health care fields, which traditionally have budget and hiring constraints, he added. □

## Firm intros devices tying LANs to frame relay, SMDS

By Bob Brown  
Senior Editor

SANTA MONICA, Calif. — A start-up company here last week outlined its plans to offer a series of RISC-based access devices for tying token-ring and Ethernet LANs to frame relay nets and Switched Multimegabit Data Service links.

NetVantage is pitching its gear as cost-effective access devices that both provide wide-area links between local-area networks and supply bridging functions, leaving more sophisticated routing to the public network itself.

### Let the carriers do it

"We believe that the modern digital carrier networks provide an opportunity for a level of simpler access devices," said Kent Lowell, director of sales and marketing at NetVantage. "The new carrier services are effectively moving sophisticated premise routing and switching devices to

the carriers."

NetVantage, which was established by two of the original founders of Retix, will demonstrate its first products at INTEROP 92 in San Francisco this

**The NV-8510 will be based on NetVantage's NV-3211 WAN Front End Processor.**

▲▲▲

fall and make them generally available beginning in December.

The company's first products will be the NV-8510 Frame Relay Concentrator and NV-8530 SMDS Concentrator for tying token-ring nets to frame relay and SMDS nets, respectively. A third, as yet

unnamed product will link LANs via point-to-point wide-area circuits but will be upgradable to support frame relay or SMDS.

The products will consist of an eight-slot chassis with a Reduced Instruction Set Computing-based controller board designed to support interface modules for various local- and wide-area networks, Lowell said.

The NV-8510 will be based on NetVantage's NV-3211 WAN Front End Processor, a controller board that runs frame relay software on its Advanced Micro Devices, Inc. RISC-based chipset.

The NV-8510 will support up to two token-ring cards and provide protocol-transparent local bridging between the two rings using the source routing bridging algorithm. It is manageable via IBM's LAN Network Manager and includes an internal data service unit/channel service unit.

NetVantage will begin shipping Ethernet cards for the 8510 about three months after the token-ring cards hit the market. Arcnet cards will ship next year.

The NV-8530 will consist of the same base controller board as

(continued on page 46)

## New nets pose mgmt. dilemmas

By Bob Brown  
and Joanne Cummings  
Network World Staff

BOSTON — A battle is brewing within corporate information systems groups across the country as managers jockey to grab control of emerging enterprise LAN internetworks and distributed computing environments, according to speakers at a net management conference here last week.

Management of internetworks and distributed computing environments was a hot topic at the first Managing Enterprise Networks Conference, sponsored by *Network World* and Digital Consulting, Inc.

Whereas local-area network managers, net managers and MIS directors previously had fairly well-marked territories, internetworks and distributed computing nets cross boundaries.

"Users that have adopted distributed computing are just now starting to realize that not only technically, but organizationally, as well, distributed computing is not business as usual," said Mary Johnston Turner, a principal at Northeast Consulting Resources, Inc. in Boston.

"Most users have been concentrating on distributing the applications and are just now reaching enough critical mass to realize they need to support them differently," added Turner, who made a presentation at the conference on organizing a management staff to get the most from a corporate net.

In many companies, the move

to distributed computing has been pushed by technically oriented end users, such as engineers, who have been handling day-to-day operations and support, she said. These users do not believe the corporate MIS department, which is usually mainframe-oriented, has the skills to support distributed computing.

"But as corporate comes to terms with the fact that the mainframe isn't king of the hill anymore and builds up its expertise in distributed computing, then I think they'll gain credibility and be able to take over more of the responsibility that now often rests with the end users," she said. "But it will be a multiyear transition for most companies."



PHOTOS © 1992 MARK SELIG

Bruce Morrell

According to Turner, the key to successful implementation of distributed computing is formally appointing the support organization, whether it is corporate MIS or local end users. If this agreement is not reached, the organization

could find itself duplicating efforts, setting disparate standards and eventually ending up with "parallel internetworks that barely speak to each other," Turner said.

Bruce Morrell, manager of strategic communications at Electronic Data Systems Corp. and vice-chairman of the user advisory council for the Network Management Forum, agreed.

"When moving to a distributed computing environment, most problems encountered come more from a business than a technology standpoint," said Morrell, who also spoke at the conference. "Most people focus on the technical tools, but the problem is bigger than that."

### Effect of equipment

Morrell stressed that users must be aware that changes in

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### Get in touch with the R.A.F.

The Reader Advocacy Force (R.A.F.) tackles the tough issues facing our readers — the buyers of network products and services. As consumer advocates, we want to hear about any problems you've encountered with products, service and support, or interoperability of equipment, as well as any other concerns you have.

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# SynOptics unveils support for fiber-optic Ethernets

New LattisNet Model 504A Transceiver will be compatible with the emerging IEEE standard.

By Skip MacAskill  
Staff Writer

SANTA CLARA, Calif. — In an effort to enhance support for fiber optic-based Ethernet devices, SynOptics Communications, Inc. today will roll out a transceiver designed to comply with the emerging Ethernet-over-fiber standard.

The LattisNet Model 504A 10Base-FL Transceiver will meet the IEEE 802.3 10Base-FL draft standard proposal for fiber optic-based Ethernet, which is expected to be finalized by year end.

The new standard will allow fiber-optic links to be as long as 2 km — twice the distance currently allowed by the Fiber Optic Inter-Repeater Link (FOIRL) standard — as well as specify connections between fiber-optic net devices, such as those between repeaters or from workstations to repeaters.

## Features of the 504A

The 504A, which is used with attachment unit interfaces on concentrators, repeaters or workstation interfaces, has front-

panel diagnostic LEDs indicating power, transmit, receive and collision status.

It also comes equipped with an external Signal Quality Error test switch that allows customers to configure the transceiver for attachment to a workstation or IEEE 802.3 repeater.

The 10Base-FL draft standard further specifies that 10Base-FL multistation access units (MAU) be interoperable with FOIRL-based MAUs, meaning the new SynOptics transceiver will work with the company's existing FOIRL products, including the 3304-ST Ethernet Fiber Optic Host Module, which sits in the System 3000 hub.

The 504A joins the 504-ST and 504-FSMA in SynOptics' fiber-optic Ethernet transceiver line. The new addition is available now and costs \$495. ■

# Lotus ships multisession version of cc:Mail gateway

Product lets eight users dial into message net.

By Wayne Eckerson  
Senior Editor

CAMBRIDGE, Mass. — Lotus Development Corp. last week began shipping an OS/2 version of its cc:Mail gateway that lets as many as eight remote users dial into a cc:Mail message network.

The cc:Mail Multisession Gateway for OS/2 software resides on a single OS/2 workstation that can route electronic messages between local or remote cc:Mail users on DOS, Windows, OS/2 and Macintosh computers.

The gateway routes electronic mail between users on local-area

networks, remote LANs via a LAN bridge or stand-alone computers via dial-up or X.25 connections.

"The OS/2 gateway enables multiple remote users to simultaneously dial into the network and exchange messages with others as if they were on the same LAN," said Chuck Stegman, Lotus' cc:Mail product manager.

Previously, the company offered only a DOS-based cc:Mail gateway that supported one session at a time from a single personal computer.

The new gateway routes mail messages to file servers on local

or remote LANs, where the messages are stored under the cc:Mail architecture. Also, it sends messages to users on other E-mail systems, including Novell, Inc.'s Message Handling Service (MHS), via other Lotus mail gateways.

The gateway supports automatic directory exchange, which enables interconnected cc:Mail directories to be automatically updated when changes are made to any directory in the network. It also supports cc:Mail's Task Manager, which is software that enables administrators to schedule activities or set parameters governing remote cc:Mail message system operation.

The cc:Mail Multisession Gateway is priced at \$3,495. Users of the DOS-based cc:Mail Gateway can migrate to the OS/2 version for \$1,495. ■

# User learns tough lesson

*continued from page 1*

regulatory and law enforcement agencies, including the Federal Communications Commission, the California attorney general's office and even the Federal Bureau of Investigation's fraud division. He is also rethinking the remote maintenance contracts he has on 80% of his equipment.

While the account is actual — brought to *Network World's* attention in the search for legal precedent — the name has been changed pending possible litigation.

Smith's story, however, underscores a simple but often overlooked vulnerability — vendor vengeance — and serves as a grim reminder that users should pay more attention to maintenance contracts.

Although it is unclear what

will happen in Smith's case, there is at least one similar case on record.

In October 1990, Revlon, Inc. filed suit against Logisticon, Inc., a small Silicon Valley software developer, after the company dialed into and disabled systems at two Revlon distribution sites.

The sabotage put those sites out of commission for three days and cost millions of dollars in losses.

James Conroy, who at the time was special counsel and vice-president of public affairs for Revlon, said the company could find no legal precedent for the incident but filed a case seeking compensatory and punitive damages.

Although the case was ultimately settled out of court and the terms of the settlement are confidential, Logisticon's phone has been disconnected and it is no longer listed by directory assistance.

tance.

Brian Moir, counsel for the International Communications Association, said there is no legal precedent here because the cases are often not settled in court. In addition, there is no federal law governing such actions and each state treats the problem differently.

He suggested that Smith get himself a good commercial lawyer to study the prevailing California laws.

To make matters worse, users' vulnerability to such acts is increasing as more companies look to outside support services and outsourcing, according to Mary Johnston Turner, a principal with Northeast Consulting Resources, Inc. in Boston.

"There's a real science to negotiating service contracts, and the legal language hasn't caught up to the capabilities of the tech-

*(continued on page 7)*

# Teleos offers up switched digital LAN access devices

By Jim Duffy  
Senior Editor

EATONTOWN, N.J. — Teleos Communications, Inc. last week brought out products that let remote users access a central LAN via switched digital services at prices comparable to using modem pools.

The CommuterSystem comprises a local-area network-resident communications hub and

**T**he system uses TCP/IP services to give remote users access to Ethernet LANs.

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adapter cards for connecting remote personal computers to the hub. The system uses Transmission Control Protocol/Internet Protocol services to give remote users access to resources on Ethernet LANs via switched 56K bit/sec and Integrated Services Digital Network lines.

Central to the product family is the CommuterHub/PRI, a five-port system that supports an

ISDN Primary Rate Interface (PRI) board, an Ethernet LAN adapter, a modem connection to a remote diagnostic center, and a monitor and keyboard for local diagnostics and control.

The CommuterHub/PRI sits on an Ethernet LAN and is linked to the public network over an ISDN PRI line.

Users on IBM PCs at remote sites — either remote office locations or at their homes — can dial into a hub using either Teleos' ISDN CommuterCard/PC, which supports ISDN Basic Rate Interface (BRI) channels, or SW56 CommuterCard/PC, which supports switched 56K bit/sec links. As many as 23 remote users can simultaneously access the hub via its PRI link.

Both cards include packet driver software and TCP/IP-based software, such as Telnet, File Transfer Protocol and Sun Microsystems, Inc.'s Network File System.

The packet driver for both boards is responsible for setting up the call. It maps the IP address from data packets to a directory number, dials the number and then tears down the call when no traffic is sent within a user-specific time period.

The CommuterSystem costs  
*(continued on page 46)*

# Suits, T's meet at MacWorld

*continued from page 2*

ics, Inc.'s SecurID ACE/Server security system plus the ability to limit which zones, or logical network segments, users can access.

Going beyond Macintosh-only networks, Lotus Development Corp. will show its Macintosh Client for Notes, the company's OS/2-based group communications server. Lotus is not, however, expected to go as far as finger-ing a price and ship date for the long-awaited software, which lets Macintoshes participate in the custom applications corporations build on Notes' tightly knit database and messaging services.

Best known for its Macintosh Ethernet products, Asante Technologies, Inc. will announce a connector that can attach up to two LocalTalk devices to an Ethernet network of Macintoshes. AsantePrint, due in September for \$549, lets managers password-protect LocalTalk printers or shared modems connected to AsantePrint.

Learning Performance Corp. will debut security software that makes life easier for managers of Macintosh networks that have multiple users, such as in school labs. The EasyShare menuing system, which the company will debut at MacWorld, will restrict different users from out-of-bounds resources such as hard drives and network servers.

The expo will draw an unusual participant this year, Hewlett-Packard Co. Looking to muscle in on the personal digital assistant business before Apple gets its Newton hand-held communicator off the ground, HP will be on hand showing several Macintosh connectivity applications, such as those for paging and file transfer, running on its own pint-sized HP 95LX.

Those looking for a connection should also keep their eyes peeled for Macintosh networking players that announced new products at Mactivity '92 held in Santa Clara, Calif., last month. Many, such as Dayna Corp., with its low-cost LocalTalk-to-Ethernet router, will be on hand to show their new wares. ■

**MACWORLD  
EXPOSITION  
BOSTON '92**

# IBM exec maps out 'new' SNA

*continued from page 1*

For the foreseeable future, our industry will have to live with the coexistence of three types of networks: traditional Systems Network Architecture, the newer Advanced Peer-to-Peer Networking-style SNA and multiprotocol bridge/router nets. How is IBM addressing this complexity?

The Networking Blueprint (see graphic, page 1) is a technology strategy that provides a framework for integrating the seemingly disparate environments. The blueprint is composed of standards and open architectures, and we believe it is a multivendor blueprint, not just for IBM.

At the top of the stack, application software programs are protected from network changes through the use of standard [application program interfaces], such as the Common Programming Interface for Communications (CPI-C), or a standard remote procedure call (RPC) interface.

At a lower level, the Common Transport Semantics layer enables applications to run over non-native transports. For example, Sockets-based applications from the TCP/IP environment can be executed over an SNA network without running TCP/IP. Additionally, the blueprint provides for future high-speed sub-networks based on technologies such as Asynchronous Transfer Mode (ATM), without disrupting installed applications or transport protocols.

## Do all the different platforms and protocols really get equal treatment?

Yes. All platforms that need consistent, enterprisewide, peer-to-peer networking should adhere to the blueprint for their networking functions. But remember that [vendors] can choose to implement only the parts of the blueprint they need. Some protocols are important enough for every product to provide. We've got TCP/IP on every platform, just like we do APPN. You could take IBM RS/6000s, PS/2s, System/390s and AS/400s, and put them together with products such as the 6611 router and the 3745 in a network running only TCP/IP.

## How does the blueprint address deployment and migration?

The blueprint gives us a path for accelerating the movement of SNA networks into the brave new world of peer-to-peer and multiprotocol, multivendor network-

ing. We've already done much of the development work to move the existing hierarchical network to a full peer-to-peer network with our investment in APPN for VTAM. There is much internal code and design to fully map the new network to the old network.

## ...the APPN network to the traditional SNA subarea network?

Exactly — so that customers won't have to flash cut their networks over. They can do it at their own pace. They can arbitrarily select the VTAM system to migrate to APPN, and even there, they can arbitrarily migrate one line at a time during any time period.

## What kind of design tools can users expect for hybrid networks?

There's a tool called [Network Design and Analysis or NETDA] that takes a VTAM/[Network Control Program] network design and spits out the path statements necessary to define traditional subarea network routes. That product is going to be upgraded to handle APPN networks on top of subareas in an integrated way. It's going to come out with VTAM next year.

## How does it work?

APPN finds routes dynamically. But you don't want that to be arbitrary and capricious. So there are these 'knobs' called Classes of Service, and they're real robust — [users can control] delays, throughput, security, response time, etc. Even though [APPN] routes are computed dynamically, you want the knobs there so customers can control how these routes are computed. But there are so many knobs that it can be complicated.

We expect the default APPN settings to cover most cases, but the [NETDA] tool allows fine-tuning of secure routes, interactive routes, batch routes, and high- and low-bandwidth routes. If you can specify general parameters, the tool will come back and say that you need network nodes in these locations and everything else can be end nodes. Then APPN can go do its thing.

## Not everyone is in love with APPN. What do you say to the end users that think the Network Basic I/O System is all anyone will ever need for networking?

If your total focus is a few interconnected LANs, then you don't really appreciate the problems. But if you ever think that your LANs are going to get bigger and extend across a wide-area network, and maybe one day attach a mini, or — heaven forbid — connect to a mainframe or a remote cluster of RS/6000s, then

a network protocol more robust than NETBIOS will be required.

But a lot of LAN-specific applications already exist. So just as we will carry the VTAM and 3270 applications forward over APPN, we will carry all the existing NETBIOS applications over the evolving SNA network.

We don't need to extend LAN-specific protocols to become wide-area networking protocols. Instead, we should continue to optimize robust WAN solutions that can support LAN-based products across the wide area. OS/2 Extended Services and Networking Services/DOS are good examples of this.

Also, what I'd like to do is get the LAN interface calls mapped to the APPN network, the same way we're doing Sockets over APPN. For example, by mapping NET-



“APPCC has superior flow-control functions.”



BIOS interface calls to APPN, existing LAN applications magically start running over SNA on LANs and WANs [using] any media, with no gateways or protocol translation.

## Your blueprint attempts to integrate the full spectrum of commercial network protocols. But how do corporate software programs fit into this grand scheme?

We are bringing the services that applications need all the way up into the API level, but we're doing it in a network independent way. I want the applications to be able to get basic data transport functions. I also want them to get security, transaction recovery, directory functions and so on.

I want them to get all of those services without regard to underlying protocols. The application shouldn't know whether it's APPN or TCP/IP down there, but it should still see all the services, no matter whether they're sitting on an MVS, AS/400, PS/2, Apple Macintosh, Sun workstation or whatever.

## Do you see the CPI-C API as a good enabler of independence from platforms and protocols?

Yes. With CPI-C, we have a lot of network independence because the environment can run over any of the transport protocols. We're already shipping it over SNA, and we're working with a customer to ship it over TCP/IP. We can map it not only to APPC,

but also to the OSI Transaction Processing protocol. And CPI-C is shipped on all of the [Systems Application Architecture] systems, is announced for AIX on the RS/6000, as well as for DOS and Windows, and is available from other vendors.

## How exactly would this work for TCP Sockets running over APPN transport?

To map TCP Sockets on top of SNA — what we call 'SNAckets' — we're going to first use a couple of half-duplex APPC — LU 6.2 — sessions. Later on, we'll probably change that to a single full-duplex connection. It will be an efficient implementation because some of the upper layer APPC functions that aren't used by Sockets applications can be bypassed.

## A number of software tool vendors are trying to enable distributed applications by providing programmers with an easy-to-use interface above APPC, TCP/IP and OSI. These are the 'middleware' APIs that include message-passing and RPC. By inserting themselves between the application program and the transport pipes, don't third-party APIs threaten your blueprint's top-to-bottom solution?

Actually, message-queuing, or message-passing, services are an important part of the blueprint. We recognize that customers have requirements for conversational, RPC and message-queuing application environments. One possible implementation is to provide message-passing services over APPC network connections. The blueprint allows this solution as well as others, such as message queuing over TCP/IP connections.

## That sounds good, but third-party middleware API vendors often use efficient datagram protocols, such as NETBIOS or Internetwork Packet Exchange (IPX), on the LAN and session-oriented protocols, such as TCP or APPC, only on the WAN. How does this fit into the blueprint?

If you are running one type of transaction — say, message passing — piped over another type of connection, the end-to-end man-

agement tasks can be more complex. For example, if asynchronous transactions are being piped through APPC sessions, it can be difficult to correlate failed transactions with a network path outage. Also, network tuning becomes more complex because the application traffic patterns through intermediate nodes are more difficult to decipher.

## Is it better to base middleware and other application interfaces on end-to-end APPC-type sessions?

The gathering and correlation of management data is more straightforward with end-to-end sessions. There are also functional and performance reasons for wanting to run a connection-oriented environment such as APPC/APPN.

For example, although TCP is also an end-to-end protocol, it does not have the robust error-recovery and security services for applications like those in APPC. APPC/APPN routes all messages for a session across the same physical path, enabling easier management and more stable traffic patterns.

Additionally, the transmission priority functions of APPN provide for guaranteed response times at relatively high bandwidth utilizations.

All of these characteristics are important regardless of whether the network is a LAN, a WAN or a mixture. So it is important to run APPC all the way to the desktop, especially for critical client-/server applications. Why choose one protocol for the LAN, another protocol for the WAN and put a gateway between them when a single, performing, manageable protocol can be used everywhere?

## One of the reasons people in the past have used NETBIOS and other LAN protocols on the desktop is performance and efficiency.

It has already been proven with measurements that APPC implementations achieve and sustain higher throughputs than corresponding NETBIOS implementations. APPC has superior blocking and flow-control functions.

As file-transfer sizes get larger, the APPC throughput gets better. I am convinced that in apples-to-apples comparisons of optimized implementations, APPC is a faster protocol than both NETBIOS and TCP/IP.

## Are there any other potential problems with third-party middleware APIs?

One of the things middleware vendors have to deal with is how to operate over the different transport protocols. Currently, they're writing their own map-

ping layers underneath their APIs to mask the differences between SNA networks and OSI networks and TCP networks and LANs. But because each vendor interfaces to the networks differently, they've solved this problem in different ways. This is where the Common Transport Semantics comes in.

### So this transport standard can create a single, uniform interface to all the underlying network transport protocols?

Yes. By following the Common Transport Semantics part of the blueprint, developers can enable a wide range of application environments to operate over any one or more networking protocols. The whole intent is to help people, such as middleware vendors, to start doing network interfacing in a common way.

This has so many benefits: Customers can independently choose application environments and networking protocols; middleware vendors can write to the network in common ways; and IBM can more efficiently structure its development resources.

### Haven't other groups tried to do this?

Common Transport Semantics is the only generalized approach I've seen that's actually architecting the details, such as name and address translations, across a wide range of protocols. We think this is going to be key to helping make sense of all this multiprotocol mess. We're trying to enlist other vendors in this approach.

## User learns tough lesson in contracts

*continued from page 5*

nology," she said. "It's wide open, and people are going to have to be more careful as they negotiate these [remote maintenance] contracts."

Having learned about it the hard way, Smith offered some words of wisdom to users looking to avoid contractual pitfalls.

First, make sure your maintenance contract clearly spells out what is considered acceptable use of the maintenance port. Since laws vary from state to state, it may be necessary to alter the contract language accordingly.

Secondly, establish a procedure for using the dial-up port. Smith suggests having vendors call in to get permission to use the port so that an entry log can be kept. "That way, you know when and why they are accessing your system," he said.

In addition, users should get in the habit of changing on a monthly basis the maintenance port phone numbers.

Schooling staff is critical, as well.

"You should never give out the maintenance port number to somebody calling in from the outside" because you can never tell if they are a legitimate representative of the vendor, Smith said. This practice also helps secure the system from hackers, he added.

Finally, Smith suggested that users lock up the documentation concerning the maintenance port.

"This isn't rocket science," Smith said. "It's good common sense. But it's something a lot of people don't think about." ■

### How serious is IBM about the multivendor aspect of the 'new' SNA?

Very serious; we are committed.

I recently had a very interesting discussion with one of the internetworking vendors. The vendor asked, 'Why is it you're licensing the APPN network node?' And I say, 'Well, because we want to be open, and we know that customers aren't going to buy this technology unless it's available from multiple vendors.' And the vendor's response was, 'You'll have to forgive me if I'm skeptical, but I don't believe anything IBM does like that. I think you're only do-

ing this for your own good.'

### They didn't see the long-term benefits for IBM?

It was bordering on cynical because he literally said, 'Are you sure you're not setting me up for the kill two years from now?' And I said, 'No, no, no. Our customers are right; it is a multivendor world, and we are changing our business procedures accordingly.'

Certainly, one of my key goals is to help IBM be a leading supplier of networking products and to make money.

In today's environment, that means using industry technologies and standards, and sharing your own technologies with other vendors. We're now committed to an integrated, multiprotocol environment. We're also committed to the multivendor environment, putting the APPN technology out on the street. And if somebody else does it better than me, then they win and I lose.

I am convinced that a large segment of the networking marketplace wants and needs APPN, and we are doing all we can to keep it moving. ■



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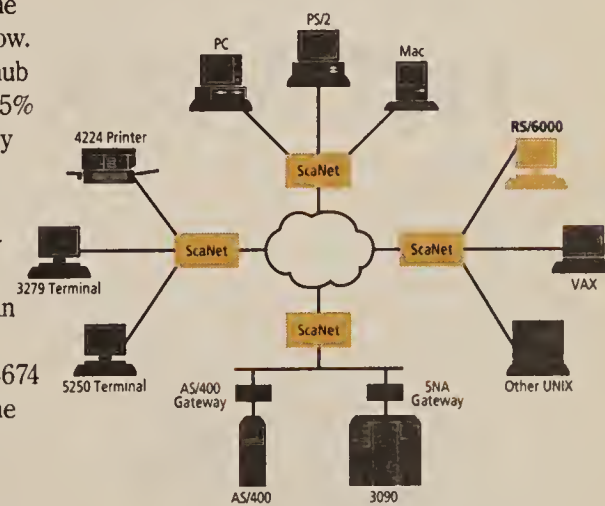
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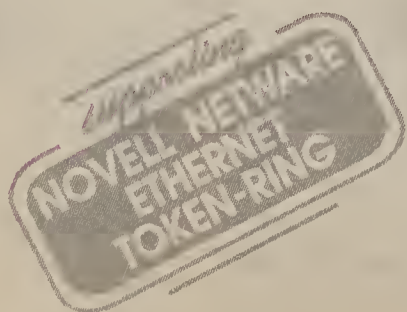
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LanFast is a LAN resident, dial-in/dial-out device, consisting of a V.32 bis/V.42 bis modem and a LAN adapter packaged in a single box. Model DM-20 supports Ethernet thick, thin or 10BaseT; model DM-25 is the Token Ring version. Three levels of security deny access to unauthorized users, and a second high-speed serial port extends network reach by accommodating an external modem or high-speed digital device.

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# DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

## Worth Noting

“It’s a tune-up, not an overhaul.”

Jeffrey Case  
President

SNMP Research, Inc.  
Knoxville, Tenn.  
Referring to the impact the Simple Management Protocol will have on SNMP installations

## Data Packets

**Digital Equipment Corp.** last week brought out software that connects Apple Computer, Inc. Macintosh systems to its network storage devices.

InfoServer Client for Macintosh software works with DEC’s InfoServer 150, an Ethernet LAN storage server. InfoServer 150 stores read-only data on CDROM and allows access to this information for as many as 100 users.

The InfoServer 150 also works with MS-DOS, VMS and Ultrix clients in Novell, Inc. NetWare and DEC Pathworks local-area networks.

InfoServer Client for Macintosh reportedly improves the performance of Macintosh multimedia applications by 30% to 60%. The software is priced at \$785 and is available now.

**Digital Communications Associates, Inc.** last week unveiled a version of its IrmaLAN Windows software for Digital Equipment Corp.’s DECnet/Systems Network Architecture gateways.

IrmaLAN Windows Client lets Microsoft Corp. Windows clients in a DEC Pathworks LAN emulate IBM 3270 terminals and access data on IBM mainframes through DECnet/SNA gateways.

IrmaLAN Windows Client is available in North America now from DEC. It is priced at \$495 for a single-user version, \$6,195 for a 25-user version and \$29,995 for a 250-user version. □

## StrataCom shores up IPX line with added features

Ups speed, capacity, mgmt. capabilities of IPX.

By Michael Cooney  
Senior Editor

SAN JOSE, Calif. — StrataCom, Inc. last week announced software and hardware products that promise to pump up the capacity, speed and manageability of its IPX FastPacket T-1/E-1 multiplexer family.

A new version of system software — IPX Version 6.0 — coupled with a new, more powerful board — the Channelized Data Pad (CDP) — doubles the switch’s voice capacity while giving users more net configuration and management options.

One CDP card handles the communications functions previously performed by four voice cards. It also doubles the IPX’s standard voice compression ratio from 4-to-1 to 8-to-1. Therefore, more voice channels can now be handled by a single CDP.

The CDP processes data at 64K or 56K bit/sec and mixes it with voice transmissions on a single wide-area trunk. Together, these features free up IPX slots for other CDPs or data-only cards.

The new card and software run in the IPX Models 16 and 32. Current IPX users can field upgrade to the new card and software, StrataCom said.

IPXs can now be configured to support just about any combination of frame relay, voice or low-

One CDP card handles the functions previously performed by four voice cards.



speed data communications cards, said Bryan Long, data communications product line manager for StrataCom.

“The CDP frees up a lot of real estate inside the IPX, where users can add more frame relay, low-speed data or video cards,” Long said. “Users can now more eco-  
(continued on page 12)

## UB to employ Eicon 3270 technology

By Michael Cooney  
Senior Editor

SANTA CLARA, Calif. — Under the terms of a technology partnership announced last week, Ungermann-Bass, Inc. will replace its current PC-based 3270-emulation software with 3270 software from Eicon Technology Corp.

Eicon, a local-area network-to-mainframe software firm, will provide UB with two personal computer-based 3270-emulation applications — Access for Windows and Access for DOS. UB will stop selling its 3270-emulation products Sept. 30.

The announcement brings Windows support to UB 3270 users for the first time and improved host-session connectivity. For Eicon, the partnership

means it now has access to some of the largest LAN users in the LAN-to-host market.

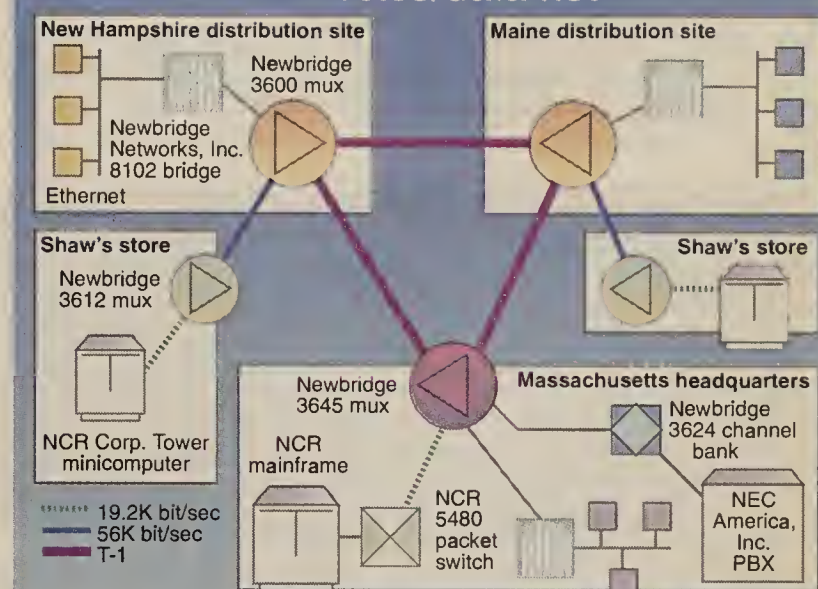
### What’s in the package

The Access for Windows and DOS software packages run as a split stack between the PC on the LAN and UB’s DOS-based Net/One Systems Network Architecture gateway. The gateway supports eight multiple concurrent sessions from a single workstation to the mainframe, with a maximum of 64 sessions per gateway, said Surya Panditi, UB’s business unit leader for Access/One products.

The packages include UB’s LAN 3270 Workstation Driver software, which converts UB protocols into SNA protocols. Although the driver only works with UB’s Net/One SNA gateway, the company said that if users do not implement it, the Access products can work with non-UB gateways from Attachmate Corp. or IBM, for example.

Previously, UB 3270-emulation software neither supported  
(continued on page 10)

## Shaw’s rings up groceries with T-1 voice/data net



Shaw's T-1 and 56K bit/sec digital net provides twice as many voice channels as the analog net it replaced, with data speeds fast enough to support interactive applications such as check verification.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: SHAW'S SUPERMARKETS, INC., EAST BRIDGEWATER, MASS.

## T-1 keeps Shaw's on top of grocery game

Move from analog to digital helps grocer support interactive data applications, more voice circuits.

By Jim Duffy  
Senior Editor

EAST BRIDGEWATER, Mass. — Shaw's Supermarkets, Inc. finds it easier to keep its shelves stocked these days thanks to a Newbridge Networks, Inc. T-1 network that has enabled the company to expand its application portfolio and increase its network capacity.

Shaw's, a New England grocery store chain, installed the T-1 backbone between company headquarters here and distribution centers in New Hampshire and Maine to better support the company's check verification, payroll, accounts payable and grocery reordering applications.

Though sensitive to the cost of leasing lines and purchasing new data and voice communications gear, Shaw's is nonetheless predisposed to maintaining a high-throughput network to compete effectively in the cutthroat grocery industry.

“We didn’t put [the T-1 backbone] in and save money,” said Thomas Kieran, telecommunications manager at Shaw's. “We spent more money, but we knew we were going to do more data communications to run the business better than the competition.”

Shaw's is spending 50% more

for leased digital lines than it spent for its leased analog lines, but the company is getting a four-fold improvement in throughput and twice as many voice channels, Kieran said.

Most other supermarket chains are installing very small aperture terminal satellite networks to support data communications and are running voice over separate terrestrial networks, whereas Shaw's is combining voice and data over a single backbone.

Shaw's evaluated a VSAT setup as well as a microwave network. Although VSAT is good for batch file transfers, it “ruins your response time” for more interactive applications, such as order retrieval and stock information, said Al Joughin, vice-president of operations at Shaw's.

Shaw's locations are too dispersed to take advantage of microwave transmissions, Joughin added.

So the company opted to replace tie lines between private branch exchanges at its headquarters and its two distribution sites with a T-1 backbone based on Newbridge's MainStreet 3645 and 3600 bandwidth managers. The 3645 is located at the company's headquarters, and a 3600

(continued on page 12)

# Telepartner eases financial strain with usage-based software pricing

By Jim Duffy  
Senior Editor

FARMINGTON, Conn. — Telepartner International last week introduced a licensing policy designed to break down financial barriers to purchasing mainframe-based electronic software distribution packages for IBM networks.

The policy, called Usage-Based Licensing, is an option for users of the company's Synchrony software distribution product. The concept behind Usage-Based Licensing is to lower the entry price of mainframe-based software distribution products.

To lower that price point, users are

charged a transaction fee based on their actual Synchrony usage, after they have satisfied a low initial and quarterly fee. The alternative would be to charge a one-time fee based on the number of users, company size or other determinants, according to Telepartner.

Usage-Based Licensing is tallied through a meter in the communications manager component of Synchrony that counts the software licenses distributed to client workstations in a network. The communications manager then tracks and manages the distribution of software li-

censes throughout the net.

Vendors such as IBM and Tangram Systems Corp. offer packages similar to Synchrony, but those can cost from \$50,000 to \$250,000, according to Matthew Cain, an analyst at the META Group in Westport, Conn.


The initial fee for Synchrony is \$10,000, with an additional \$4,500 cost every three months, which covers 600 Synchrony transactions, said Ken Dixon, vice-president of Telepartner's Synchrony Business Group. After that, users are charged between 75 cents and \$5 per transaction, based on the number of transactions made.

This pricing strategy, along with the rationale behind electronic software distribution — avoiding postage, shipping and labor charges for distributing software diskettes — should loosen the purse strings of even the stingiest companies, Cain said.

"Software distribution is one of the easiest things to cost-justify," he said. "The savings become relatively apparent."

Usage-Based Licensing is not for all companies, however. Enterprises with large distributed networks that perform tens of thousands of distribution transactions a quarter may find it more economical to purchase a site license, Dixon said. The Usage-Based Licensing option is merely aimed at lowering the entry price of mainframe-based electronic distribution software.

New Synchrony customers opting for the Usage-Based Licensing pricing scheme are committed to that plan for six months, after which they can continue with that plan or change to a site license. ■



**Tuesday,  
June 2,  
1992**

## It was the height of The Great Air Fare War...

And the busiest day ever for the worldwide Apollo computer reservation network: owned and managed by Covia Partnership.

On that day, the Apollo network was bombarded with over 2,000 messages per second. And, while reservations activity soared, so did the performance of their umbrella network management system: co-developed by the BellSouth Advanced Networks systems integration group and Covia network managers.

According to Tom Bruscino, Covia's Manager of Network Operations, "While other reservation networks were going down, we kept ours running. We did not lose a single front-end thanks to our network management system. It allowed us to proactively monitor thresholds and issue controls on all of our linked front-ends through one terminal. And that helped us keep our network up during the highest volumes we'd ever experienced."

Covia's platform of choice was BellSouth's Hybrid Customer Network Management (HCNM). HCNM architecture supports powerful hardware and software building blocks from leading technology vendors such as Applied Computing Devices, whose toolset helped craft the Covia solution.

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## UB to employ Eicon 3270 technology

*continued from page 9*

multiple concurrent sessions nor had Windows support. It also would not work with non-UB emulators.

The new software is an attempt by UB to remain competitive in a market where it has not done well. UB needed to show it could integrate other vendors' technology into its gateways, analysts said, like other major SNA gateway players, such as Attachmate and Rabbit Software Corp., have done in recent months to remain competitive.

"Ungermann-Bass didn't have a Windows product and needed one to stay competitive," said Lucinda Santisario, an industry analyst at International Data Corp. in Framingham, Mass. "Ungermann-Bass had been referring customers to Eicon for gateways, so the agreement was a good fit for both companies."

The Access products may not be the last technology UB licenses from Eicon, according to analysts. Eicon has a strong OS/2 3270-emulation product and is working to support Microsoft Corp.'s Windows NT net environment, as well.

Access for Windows is available now from UB for a single-user price of \$395, while a 10-user version costs \$3,000, and a 25-user version is priced at \$5,000.

Access for DOS will be available in October for the single-user price of \$195. Additionally, 10- and 25-user versions will be available at a price of \$1,500 and \$2,500, respectively. ■

# LOCAL NETWORKING

LAN HARDWARE, NETWORK OPERATING SYSTEMS AND LAN MANAGEMENT

## Worth Noting

“I’d crawl on my knees to Massachusetts if it would make Banyan write a driver for StreetTalk to NetWare Global Messaging. It would be good for the industry.”

**Carey Hackman**  
Director of  
messaging products marketing  
Novell, Inc.  
Provo, Utah

## Netnotes

For those who need plain-spoken diagnostics, **Dolphin NetWorks, Inc.** of Norcross, Ga., last week began shipping LAN Command Advanced (LCA) for Novell, Inc. local-area networks.

Starting at \$495 for 25 nodes, LCA tracks diagnostic information about clients and servers on NetWare 2.X and 3.X LANs, and offers explanations of events and errors with suggestions on how to remedy problems.

The software detects and registers net nodes and servers in its autpopulating database, works over wide-area network links, detects intruders and can forward alarms to pagers, electronic mail or other devices through scripts. It works with token ring, Arcnet and Ethernet simultaneously.

Making headway with its NetWare Desktop System strategy, **Novell, Inc.** of Provo, Utah, has released an upgrade to its DOS-based peer-to-peer local-area network. NetWare Lite 1.1 can now run on the same machine as Microsoft Corp.’s Windows 3.0 and 3.1 and can be controlled by the same commands as Novell’s other NetWare products.

Other improvements in  
(continued on page 12)

## Legato rolls out NetWare, Unix versions of software

Firm beefs up its NetWorker backup offerings.

By Caryn Gillooly  
Senior Editor

PALO ALTO, Calif. — Legato Systems, Inc. last week brought out new versions of two of its NetWorker backup and recovery packages, one designed for Unix environments and the other designed to work within Novell, Inc. NetWare LANs.

Version 2.0 of NetWorker for NetWare supports Transmission Control Protocol/Internet Protocol connections, letting a NetWare administrator back up a Unix-based client to a NetWare server.

Version 3.2 of NetWorker for Unix includes more advanced automation capabilities and support for optical jukeboxes. It will also support new client software that will let NetWare file servers be backed up as clients on Unix-based nets.

NetWorker for NetWare is a set of NetWare Loadable Modules that reside on a NetWare server. According to Rolland Day, product marketing manager at Legato, based here, when the product was first released in January, it only included support for Novell’s Internetwork Packet Exchange/

Sequenced Packet Exchange (IPX/SPX) and, therefore, could only back up NetWare clients.

“The original version was NetWare specific, but this new version lets administrators use TCP connections [between clients and servers],” Day said. “When we first announced the product, we

“This version lets administrators use TCP connections [between clients and servers].”

▲▲▲

said we would have more interoperable versions later in the year, and now we’re delivering on that.”

With the new version, administrators can back up not only NetWare 3.X servers, but also clients from 11 different Unix platforms, including Digital Equipment Corp., Hewlett-Packard  
(continued on page 12)

## Madge token-ring card optimized for new PS/2

By Caryn Gillooly  
Senior Editor

SAN JOSE, Calif. — Madge Networks, Inc. last week brought out a new token-ring adapter card optimized for IBM’s newly released Personal System/2 Model 95 XP 486 server.

According to Madge Networks, based here, the Smart 16/4 MC32 Ringnode card’s 32-bit bus-mastering takes advantage of the 32-bit functionality and bandwidth of the PS/2’s Micro Channel Architecture (MCA), providing data transfer rates of 20M byte/sec.

Also, Madge Networks claims the Smart 16/4 MC32 is the first adapter card to support the MCA bus-master streaming data mode used in IBM’s new machine.

This mode boosts data transfer rates across the MCA bus to 40M byte/sec — double the

speed available with other high-end token-ring cards. Until the release of the PS/2 Model 95 XP 486, this bus-master streaming data mode was available only on IBM’s RISC System/6000.

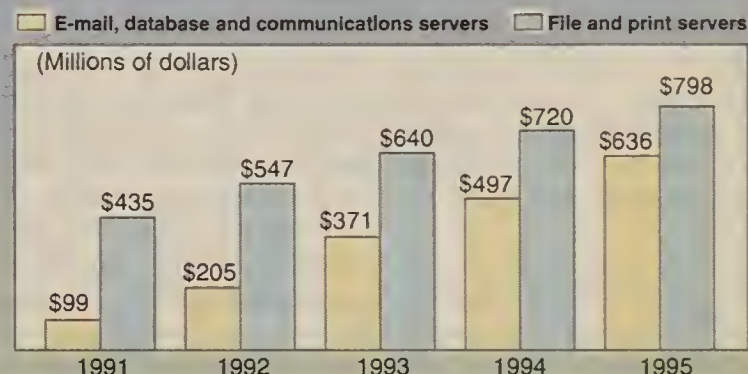
With its high throughput rate, the card is ideal in servers and gateways. According to analysts, having high data transfer rates on adapter cards is of primary importance to maintaining or boosting server performance.

The Smart 16/4 MC32 Ringnode supports shielded twisted-pair and unshielded twisted-pair cabling, in addition to remote booting using Madge Networks’ optional Smartrom electronically erasable programmable read-only memory module.

The card is available now for \$1,295, or \$1,195 when purchased in a five-pack. □

## Server shift is on

E-mail, database and communications servers catching up with file and print servers



A recent report predicts that as more operating systems ship with rudimentary file and print services, the LAN server buying spree beginning in the late 1980s will begin to slow. And Banyan Systems, Inc. is preparing for such a shift.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: FORRESTER RESEARCH INC., CAMBRIDGE, MASS.

## Banyan begins to cut loose VINES services

SCO Unix version of VINES net services to ship in Sept.; NetWare version expected by year end.

By Margie Wylie  
Senior Editor

WESTBOROUGH, Mass. — Few LAN users have had firsthand experience with Banyan Systems, Inc.’s StreetTalk, but the directory service’s good reputation precedes it — a fact that Banyan hopes to exploit with two new products due out by year end.

Banyan last week announced it will deliver in September a version of its VINES network services that not only runs on SCO Unix servers, but also integrates SCO Unix clients into VINES services. In addition, just in time for Novell, Inc.’s NetWare 4.0 debut, Banyan will begin selling its directory, messaging and other advanced services that will work with NetWare.

VINES for SCO Unix will be the first product resulting from the company’s plans to split off its advanced network services, such as directory and messaging offerings, and sell them on other platforms (“Banyan takes a new tack in LAN fight,” *NW*, June 15).

The new software will run on top of an SCO Unix server to offer VINES services to personal computer clients and, for the first time, Unix clients.

VINES for SCO Unix will not require any special client software for Unix clients and will support standard Unix interfaces, allowing Unix clients to access VINES services using Unix commands and facilities.

Banyan has tied its File Service to Unix’s Network File System and its print service to Line Printer Remote. The vendor has also hooked terminal emulation into Unix’s rlogin and Telnet commands, making it possible for Unix and PC clients to share files and printers, according to Bob Martin, Banyan’s director of

The new software offers VINES services to PC and, for the first time, Unix clients.

▲▲▲

product management.

“The only unfortunate thing is that [VINES for SCO Unix] is based on VINES 4.11, so there’s no [Apple Computer, Inc.] Macintosh support,” said Jodi Mardesich, a San Francisco-based analyst with The Burton Group of Salt Lake City. VINES 5.0, the company’s latest release of its net operating system based on its own proprietary version of Unix V Release 3, supports Macintosh clients.

VINES for SCO Unix will cost \$3,995 for a base package of the StreetTalk directory service, as well as security, administration  
(continued on page 12)

## Banyan begins to cut loose VINES

*continued from page 11*

and client services. Users can add Banyan's File System, net management, Intelligent Messaging, print, terminal-emulation, Server-to-Server Internet Protocol and application tool kit, priced separately from \$595 to \$2,295 for each option per server.

### VINES: the next generation

The 60% or so of all local-area network users currently on NetWare, however, may be more interested in Banyan's next platform-hopping product, VINES for NetWare.

Unlike Novell's top-of-the-line NetWare 4.0, VINES for NetWare will offer advanced services that are not only proven, but will span existing NetWare 2.X and 3.X LANs, Martin said.

"[VINES for NetWare] is going

to appeal to a lot of NetWare users who can layer VINES services on top of what they already have instead of buying NetWare 4.0," Mardesich said.

"If you want the benefits of directory services with Novell, you have to buy NetWare 4.0," Martin noted.

Banyan is also hoping NetWare users will be impressed by the many revisions its products have undergone while Novell is just entering the advanced services market with NetWare 4.0.

"I think it's fair to say that the VINES services are mature. Banyan is known for its services, and they've gone through many iterations while Novell is just releasing its services for the first time [in NetWare 4.0]," Mardesich said.

But Banyan is a prime example that the best technology isn't always the most successful, according to analysts who agreed that the company's historically lackluster marketing could hurt in the struggle to gain ground on NetWare.

"We're changing that," Martin said. "This is a very different company than it was three years ago."

Despite Banyan's obvious encroachment on Novell's territory and its foray into other Unix platforms, company officials said they will not abandon VINES' proprietary operating system, which it will continue to develop as the premier platform for VINES services, Martin said.

Banyan wouldn't comment on how much the NetWare services will cost but said they will consist of the same services as VINES for SCO Unix. ■

## Legato rolls out new versions

*continued from page 11*

Co., IBM, The Santa Cruz Operation, Inc. and Sun Microsystems, Inc.

On the Unix side, NetWorker for Unix 3.2 has new media management capabilities that will let the administrator access backed-up files more easily.

For example, the new software has the ability to determine exactly where on a particular tape a file resides.

In addition, Legato plans to make available software that lets

a NetWare server appear as a client to a Unix server, thereby enabling the Unix machine to view and back up the NetWare server on the Unix network.

NetWorker for NetWare 2.0 is available now, with prices ranging from \$750 for as many as 10 clients to \$4,000 for as many as 250 clients.

NetWorker for Unix 3.2 is also available, with prices ranging from \$2,000 for five clients to \$20,000 for as many as 200 clients. Legato's ClientPak III, providing the NetWare backup capabilities, will be available separately for \$1,500 in October. ■

## Firm shores up its IPX line

*continued from page 9*

nomically connect equipment such as feeder muxes and fractional T-1 LAN bridges to the IPX."

CDP cards can support 192 voice channels per card, up from the previous 96, according to Long. That frees up more slots for other cards, including StrataCom's four-port frame relay cards and eight-port low-speed data cards. The IPX Models 16 and 32 can hold 16 and 32 cards, respectively.

An optional CDP card will also be available that has on-board echo cancellation. Previously, users had to purchase a separate piece of hardware to eliminate echo on long-distance lines.

StrataView Plus Release 2.0, StrataCom's net management software, comes bundled with IPX Version 6.0. The new release, which the company announced earlier this year, gives carriers or private network users detailed real-time management information about their frame relay nets — something they never had before, analysts said ("StrataCom to unveil new frame relay mgmt. wares," *NW*, April 27).

The new software will let users monitor frame relay net status, gather net performance data, provide error tracking and produce customizable reports on throughput and net congestion.

AT&T, CompuServe, Inc. and WilTel said they will use the StrataView platform for their frame relay offerings.

A key feature of the net management platform is an open application program interface that will let carriers develop their own management applications, which in turn, will give users an on-line view of carrier-provided frame relay services.

These net management features, combined with the other enhancements to the IPX systems, have attracted at least one user's attention.

Tim Lambie, manager of inte-

gration services for National Telecom Corp., a telecommunications carrier in Toronto, said his company will test the new IPX software and CDP card as soon as he can get his hands on them.

"For us, the ability to use one card per client and bring in all of their voice and data on one manageable trunk is a key feature," Lambie said. "We can offer our customers more configuration options and better service with the new IPX release."

Lambie said his company evaluated other switch vendors but

## T-1 keeps Shaw's on top of game

*continued from page 9*

sits at each distribution site.

The PBXs, which are NEC America, Inc. NEAX 2400s, are now attached to the 3645 and 3600s through Newbridge 3624 channel banks.

Shaw's also replaced a tangle of 74 analog leased lines with 56K bit/sec digital circuits. Each analog line, called off-premise extensions, carried one voice channel and fanned out from the three NEC America PBXs to 74 Shaw's stores around New England. For data, Shaw's used 9.6K bit/sec dial-up modems.

The 56K bit/sec circuits, which connect the stores to the T-1 backbone through Newbridge's 3612 MainStreet multiplexers, provide each site with two 8K bit/sec voice channels, a 19.2K bit/sec channel for packet-switched data, including electronic mail, and another 9.6K bit/sec channel for electronic payment and check verification,

according to Kieran.

At each Shaw's store, the 19.2K bit/sec packet-switched data channel connects an NCR Corp. Tower minicomputer to the

Shaw's employees at the headquarters data center and distribution sites to access the Tower processors from Ethernet-attached Intel Corp. i386 SX personal computers. The Ethernet local-area networks are attached to the 3645 and 3600s using Newbridge's 8102 Ethernet bridges.

The PCs emulate Digital Equipment Corp. VT-100 terminals to set up a Transmission Control Protocol/Internet Protocol Telnet session with the NCR Tower either locally or over the X.25 packet links.

The Telnet sessions let Shaw's employees use the TCP/IP File Transfer Protocol to retrieve information such as the number and types of items sold, as well as which items need reordering and restocking.

Users can now download this information from all 74 stores in 15 minutes instead of the two hours it took with the 9.6K bit/sec dial-up lines. This speeds up the restocking process, according to Kieran. ■

3612. Hanging off the Tower are front-end point-of-sale systems, meat and deli scales, as well as time clocks.

The new network allows

**U**sers can now  
download this  
information from all  
74 stores in 15  
minutes instead of two  
hours.



## Netnotes

*continued from page 11*

clude disk caching for better performance, smaller memory use and enhanced print services.

NetWare Lite 1.1 will be sold with DR DOS 6.0 for \$79 per user.

Novell's NetWare Desktop System strategy is its plan to make networking easier for users, who today bear the brunt of complex LANs. Novell is expected to give the strategy more meat when it supports the NetWare Core Protocol in NetWare Lite and integrates its Data Club technology into NetWare clients.

**Laser Communications, Inc.** of Lancaster, Pa., last week

introduced the L00-28, a device that lets Ethernet Fiber Optic Inter-Repeater Link-compatible transceivers transmit their signals via laser at 10M bit/sec.

The line-of-sight device can connect local-area networks up to 1 km apart without a wire and without radio interference, which makes it ideal for building-to-building connections or roaming LANs, according to the company.

Available four weeks after receipt of order, the L00-28 costs \$16,100 and can be converted to 4M or 16M bit/sec token ring for an additional \$500.

**Tangram Systems Corp.** of Raleigh, N.C., rolled out a version of its AM:PM electronic software

distribution package that supports Apple Computer, Inc. Macintosh clients.

AM:PM for the Macintosh, which runs on an IBM mainframe, distributes software and data, collects data and performs remote data management for any number of stand-alone or local-area network-attached Macintosh clients in a Systems Network Architecture network. AM:PM sets up an LU 6.2 session between the IBM mainframe and an Apple SNA•ps gateway on a token-ring LAN or works over a Synchronous Data Link Control line.

AM:PM for the Macintosh costs \$49,500 for new Tangram customers and \$29,500 for existing customers. It is available now. ■

**A**T&T, CompuServe  
and WilTel said they  
will use the StrataView  
platform for their  
frame relay  
offerings.



settled on StrataCom because of the company's frame relay support and the new net management features included in IPX Version 6.0.

"The ability for us to write proxy agents for our customers' SNMP net management systems was another key issue," Lambie said. "Most of our customers have their own network managers. Very few users in Canada use the carrier's management platform because it is expensive."

Version 6.0 of the IPX software is available now for \$2,400. Existing users can upgrade for \$1,500. The CDP card is available now for \$12,000. With T-1 echo cancellation, the CDP sells for \$17,000. With E-1 echo cancellation, it costs \$18,000.

The new net management software costs \$10,000 for networks of eight or fewer IPXs and \$20,000 for larger nets. Existing StrataView users can upgrade for \$8,000. ■

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Unfortunately, those engineers were unable to make it to the above photo session.

Nor could the specialists who created the COMPAQ ToolKits and TechNotes—the industry's most sought-after

guides for multi-vendor network integration.

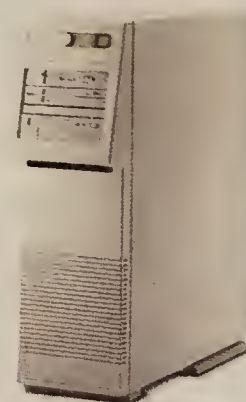
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# INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

## Worth Noting

“One of the key barriers to growth in [the router] industry is the lack of highly trained people who have an in-depth understanding of a dozen different networking environments.”

**John Morgridge**  
President and chief executive officer  
Cisco Systems, Inc.  
Menlo Park, Calif.

## Link Notes

**Artel Communications Corp.** last week released test results that showed its Galactica switching hub can offer collisionless 20M bit/sec Ethernet links between hubs.

Galactica's hub ports support either incoming or outgoing traffic. Because traffic is limited to one direction, each port has dedicated access to 20M bit/sec of bandwidth.

**Network Applications Technology (NAT)** last week announced a product promotion aimed at allowing users to affordably monitor and manage small remote local-area network sites.

Under the program, which is available through the end of the year, users can buy NAT's Simple Network Management Protocol-based NMS/100 Network Management System and the EtherMeter LAN segment Monitor for \$2,500.

The EtherMeter is an Ethernet traffic monitor for remote LAN segments that features a serial port used to establish a modem connection to the device. This lets users monitor traffic and gather statistics on remote segments when EtherMeter access via the LAN port

(continued on page 18)

## Cabletron adds transceiver, beacon recovery feature

Bolsters token-ring line with new capabilities.

By Skip MacAskill  
Staff Writer

ROCHESTER, N.H. — In a move designed to shore up its token-ring product line, Cabletron Systems, Inc. next month is expected to ship a token-ring fiber-optic transceiver that will allow users to link a fiber cable to an adapter port intended for copper.

The action comes on the heels of a recent upgrade for the company's token-ring module that will now provide beacon recovery capabilities in token-ring local-area networks.

By providing the fiber-to-copper connection, the new transceiver, dubbed TRFOT-2, allows users greater flexibility when configuring token-ring nets, according to Ted Frechette, token-ring product manager for Cabletron.

The device, for example, lets users link bridges, which are generally outfitted with copper ports, to a fiber backbone running throughout a building. It also supports fiber links to multistation access units (MAU).

“There aren't a lot of fiber-optic MAUs in use right now, but that will change when the standard emerges,” Frechette said.

TRFOT-2 will support the IEEE fiber-optic station attachment standard for token ring that is currently in ballot and expected by year end.

TRFOT-2, which is expected to ship Sept. 1, costs \$695.

### Beacon recovery

The recovery feature, called Automated Beacon Recovery,

TRFOT-2 will support the IEEE fiber-optic station attachment standard for token ring.



automatically isolates and removes faulty nodes that are beaconing on a token-ring network and restores communications within eight seconds, according to the company.

The feature is part of a software upgrade to Cabletron's i960 Reduced Instruction Set Comput-

(continued on page 18)

## Students gain academic edge via internetworking

By Maureen Molloy  
Senior Writer

GLENVIEW, Ill. — Glenbrook South High School is cultivating computer-literate students through the construction of a LAN internetwork that enables them to complete assignments more quickly and work together on tasks more easily.

The secondary school uses its network to give students an academic edge and hands-on experience with technologies ranging from word processing to electronic music composition.

“The goal is to train students on networks and computers. By doing so, the student will have a much easier time understanding how computer networks function, and the knowledge they pick up can later be applied to a corpo-

rate situation,” said Steve Romeo, network director at Glenbrook South.

Romeo began installing the network last year and recently linked it with Glenbrook North High School. Glenbrook South currently runs five Apple Computer, Inc. AppleTalk network zones, with two additional virtual net zones within the local zones. A total of 300 Macintosh workstations in the five local zones serve more than 2,000 students within the building and is operable 24 hours a day.

The AppleTalk networks are linked to an Ethernet backbone via Shiva Corp. FastPath or Cayman Systems, Inc. GatorBox AppleTalk routers, which create the zones.

(continued on page 18)

## Oil giant strikes it rich with global internet



BPX cut costs by \$20 million by deploying 100-plus Cisco Systems, Inc. routers to link sites worldwide and consolidate its data center operations.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: BRITISH PETROLEUM EXPLORATION, LONDON

## Global internet helps BPX save millions

Net of 100+ Cisco routers paves way for data center consolidation, client/server net strategy.

By Maureen Molloy  
Senior Writer

LONDON — British Petroleum Exploration (BPX) has nearly completed a data center consolidation that promises \$20 million per year in annual savings, a feat made possible by the construction of a global multiprotocol router-based internet.

The consolidation project, which began two years ago, has enabled BPX to merge its three data centers into one to reduce processing, maintenance and staffing costs. It has also served to buttress the organization's migration to a distributed client/server computing environment, said Edgar Dodds, BPX's senior communications consultant.

The oil giant two years ago began sprinkling more than 100 Cisco Systems, Inc. bridge/routers throughout its worldwide network operations to form a backbone that links hundreds of sites in North and South America, Europe and the Far East.

Dodds said the routers are an integral part of the firm's strategy to move away from large systems and will accommodate the shift from a largely mainframe-based environment to a local-area network internet supporting client/server applications.

“We chose routers because a high-performance communications network is essential to support a client/server architecture,” he said. “It will allow us to

make the migration without any pain on the wide-area network.”

The key to the client/server strategy is to give users in the field access to the data they need, something that often was not feasible in the past due to the inadequate response time wide-area links posed for bandwidth-intensive applications.

To remedy that, the company last year began splitting up its technical applications that ran on Digital Equipment Corp. and Cray Research, Inc. processors. The DEC and Cray devices handle only heavy processing chores, while the front ends to such applications run on networked personal computers and workstations in Houston, Anchorage, Alaska, and other remote sites, with only occasional communication required between the two.

The company is also in the process of moving business and personnel files housed on IBM machines to smaller platforms and instead using the mainframe for archiving and data storage.

Dodds said another key strategy that led BPX to a router-based backbone net was the desire to reduce duplication of products and technologies as well as their concomitant staff requirements and, through that reduction, realize significant economies of scale and staff savings.

The company also deployed routing technology as a way to

(continued on page 18)

# ODS hub brings high-end FDDI to low-end market

By Skip MacAskill  
Staff Writer

RICHARDSON, Texas — Optical Data Systems, Inc. (ODS) has added a new, larger model to its 1085 series of entry-level priced third-generation FDDI hubs.

The new 14-port 1085-14, which is priced at less than \$1,300 per port, rounds out the 1085 line that already includes four-, six- and eight-port models geared to work group applications.

## A real bell ringer

All versions offer the same functionality of ODS' high-end Fiber Distributed Data Interface hubs, with the exception of the ability to expand by adding new modules.

"They come with all the bells and whistles that we've added to our higher end FDDI boxes, such

as [Serial Line Internet Protocol] access and single-mode fiber optics," said Terry Gaston, the company's vice-president of marketing.

The new hub, which can be single- or dual-attached, can be configured as a stand-alone work group concentrator supporting as many as 14 end nodes or daisy-chained to any other 1085 model. An autoconfiguration feature allows the hub to automatically detect whether a port is used to attach to either an end-user node or to the ring ports of another hub.

## Smooth move

Another 1085 feature is graceful insertion, which is the ability to insert a new node onto the ring without interrupting other users already on the network.

"With FDDI, the graceful in-

sertion capability watches the traffic on the ring and inserts the station on the ring so that nothing ever has to be retransmitted," Gaston explained.

The 1085 devices support both the Simple Network Management Protocol and Station Management (SMT) Version 6.2, which provides parameters for physical connection diagnostics as well as an Echo Frame facility for loop-back testing. Since SMT and SNMP are incompatible, ODS has equipped each 1085 with an SNMP-to-SMT proxy agent, which allows the user to poll SMT devices from SNMP management systems.

All 1085 work group concentrators are available now and support both fiber-optic and shielded twisted-pair connections to desktop devices. The 1085-14 ranges in price from \$14,999 to \$40,299, depending on configuration. The 1085-8 has a price range of \$9,800 to \$23,400, while the 1085-6 costs between \$9,100 and \$13,800. Pricing for the 1085-4 starts at \$6,700. □

# Cabletron adds beacon recovery

*continued from page 17*

ing-based Token Ring Management Module (TRMM), which sits in the company's Multi Media Access Center intelligent hub.

Beaconing conditions can result from such hardware-related errors as a broken adapter card, a faulty cable or situations where users plug in devices that are not token ring-compatible or are set at the wrong ring speed.

Previously, net managers had to physically locate and disconnect faulty nodes at the wiring closet, which increased network downtime.

Once the problem is isolated and the offending node is removed from the network, the

TRMM issues an alarm to an existing net management system. The alarm reports information such as the beaconing adapter's address, the nearest active upstream neighbor's address, beacon type, which ports and modules were bypassed, and the length of time the node actually beamed.

A net management system is not required for the feature to function.

The Cabletron feature, however, is not yet up to par with similar offerings from Bytex Corp. and Star-Tek, Inc. Bytex's Beacon Guard and Star-Tek's Zero Delay Lockout can actually detect and isolate faulty nodes before they gain entry to the ring ("Bytex tool heads network disruptions off at the pass," *NW*, May 4 and

"Star-Tek enhances software with error-detection feature," *NW*, July 13).

Cabletron plans to add that capability in the near future. "We will enhance our current active Media Interface Modules by putting a ring-speed detection circuit on every port of the module," Frechette said. "It will be a more proactive approach by actually shutting down a faulty node before it gains entrance to the ring."

That enhancement is expected to be available as a free firmware upgrade next month.

Cabletron is offering Automated Beacon Recovery as a free upgrade to all its users, including those who have already purchased the TRMM. It is available now. □

## Link Notes

*continued from page 17*

is interrupted.

**Lexcel**, a Micro Technology, Inc. company, has announced two enhancements that let users customize the polling routines of its Simple Network Management Protocol-based management system.

The new tools, Table Monitor and Variable Monitor, will be shipped in August with the latest release of Lexcel's net management system, Lance+ 3.1. Table Monitor is a generic tool for monitoring variables from any SNMP Management Information Base (MIB) table; Variable Monitor provides monitoring and plotting capabilities to specific MIBs. □

# Students gain academic edge

*continued from page 17*

Within each zone sits an Apple Quadra 900 FileServer, which supports such interactive applications as Group Technologies, Inc.'s Aspects collaborative writing software and Microsoft Corp.'s Microsoft Works and Microsoft Word applications.

Each zone also houses a GatorBox to route the Ethernet backbone signal to AppleTalk and a Plexcom, Inc. PlexView Multiplexer that regulates traffic flow to the router.

In addition, the music department has purchased Korg USA, Inc. synthesizers, which will be interconnected with Macintosh computers for composing music.

The music created by the students is recorded and stored onto the Macintosh workstation, where a student can modify the notes before storing the work to a compact disc.

Although not currently linked with the Macintosh internet, the math department is served by an Ethernet local-area network supporting 25 NeXT Computer, Inc. workstations running its Mathematica math graphics and Microsoft Word applications.

## A net for all occasions

Students use the internet for many projects. One is Aspects, a network application that allows students to work collaboratively on writing assignments. Using a Shiva NetModem running at 9.6K bit/sec, Glenbrook South

# Global internet to save millions

*continued from page 17*

deliver high-speed access from the single data center in Glasgow, Scotland, out to all remote sites.

Previously, remote sites had access to nearby centers in London, Glasgow and Aberdeen, Scotland.

BPX's internet consists of major business centers in London, Glasgow, Aberdeen and Stavang-

**“We needed a new net infrastructure that would support, not hinder, our business.”**

▲▲▲

er, Norway. Major U.S. hubs in Houston, Cleveland and Anchorage are also tied in, as are drilling operations in Eastern Europe, South America and the Far East.

"Our aim was to ensure that users at remote sites would feel as if they were still adjacent to their host machines," Dodd said.

As the oil and gas exploration arm of BP America, Inc., BPX also needed a better way to communicate with the parent company's other subsidiaries, including BP Chemical, BP Research and BP Oil. It further needed to integrate the network operations of two recent corporate acquisitions, The Standard Oil Co. in the U.S. and Britoil in the U.K.

By 1990, the mishmash of computing environments throughout the BP America conglomerate proved to be an intractable management headache. The various networks were running a patchwork of protocols, including the Transmission Control

Protocol/Internet Protocol, DECnet, Internetwork Packet Exchange (IPX), Xerox Network Systems, AppleTalk and Systems Network Architecture.

"Sending data around the world was increasingly problematic and, on top of that, no one person was responsible for it," Dodds said. "We realized we needed a new network infrastructure that would support, not hinder, our business."

Previously, BPX's European net comprised about 20 Vitalink Communications Corp. bridges that formed an extended Ethernet spanning the U.K., as well as a handful of Retix and Logic Replacement Technology bridges.

The U.S. network consisted of DECnet routers only. All other protocols such as AppleTalk and IPX had to be routed via a DECnet tunneling technique, greatly adding to network overhead.

"Connecting to other BP [America] business units was a nightmare in terms of management," Dodds said. "Outages became increasingly common, and with bridging technology, a single problem would disable the entire network for hours."

To rectify the problem, BPX installed Cisco's high-end AGS+ bridge/routers at all the its major hub sites and that vendor's two-port IGS bridge/routers at remote sites. The routers have created a single internet that simultaneously handles seven different protocols.

The internet "has dramatically improved our global data communications," Dodds said. "We are now passing data seamlessly to dispersed sites around the world, irrespective of the type of computer being used." The internet's high-performance capabilities are also paving the way for future high-speed net capabilities such as Fiber Distributed Data Interface and Integrated Services Digital Network, he said. □

is linked with Glenbrook North, enabling a class at each of the two schools to work on a paper together.

Later this year, Romeo plans to replace the NetModem with fiber to enable students to ship data, voice and video traffic between the schools. "The cost is still too high and the technology still too young, but our ultimate goal is to create an internet using [Asynchronous Transfer Mode]," Romeo explained.

A number of students are also working on a joint project with Argonne National Laboratories to develop demonstration software for the NeXT computers, while others are working on a cooperative project with the National Aeronautics and Space Administration and Kraft, Inc. to

create different menus for the NASA space program.

Beginning this fall, each student in Glenbrook South will have an individual network account number for storing data on the file server, thereby enabling them to access the data from any workstation on the network.

In that same time frame, students will be able to augment their papers with full-motion video, enabling them to create a multimedia presentation for their classes. More than 450M bytes of movies have already been collected and are available on line to any student, according to Romeo.

Within two years, students will also have the ability to dial into the network to deliver text assignments electronically. □

# GLOBAL SERVICES

DOMESTIC AND INTERNATIONAL VOICE/DATA SERVICES, ACCESS EQUIPMENT AND REGULATORY ISSUES

## Worth Noting

The average cost of a phone fraud or hacking incident in 1991 was \$44,000, according to David Couchman, president of Complementary Solutions, Inc., an Atlanta call accounting system vendor.

## Regulatory Update

The District of Columbia's U.S. Court of Appeals recently decided not to give the regional Bell holding companies respite from the Modified Final Judgment long-distance ban in order to allow them to transmit out-of-band Signaling System 7 data across local access and transport area boundaries.

AT&T has filed plans with the Federal Communications Commission to offer Dedicated Transmission Service (DTS) Multipoint for FTS-2000 customers under Tariff 16. DTS Multipoint enables transmission of voice or data signals over a dedicated circuit from one location to other sites or from multiple locations to a central point using one dedicated analog or digital circuit.

Local service provider **Business Telemanagement, Inc.** of Santa Barbara, Calif., last week announced that it has merged with regional long-distance provider **West Coast Telecommunications, Inc.** The two companies will continue to operate separately, but they anticipate that pending telecommunications regulations in California will allow them to offer combined local/long-distance service packages in the beginning of next year. ■

## Cincinnati Bell seeks PUC's OK to offer CLASS services

Telco wants to provide caller ID and call return.

By Bob Wallace  
Senior Editor

CINCINNATI — Cincinnati Bell Telephone has filed an amended request with the Public Utility Commission (PUC) of Ohio for permission to offer a series of Custom Local Area Signaling Services (CLASS) called Custom Calling Plus to users throughout the state.

In the amended filing, Cincinnati Bell asks to offer two more CLASS services: caller ID and call return. The telephone company originally asked the PUC to roll out five CLASS services: call tracing, call block, priority call, priority forward and repeat dialing.

The carrier deferred filing for caller ID and call return until the Ohio PUC had established guidelines on how the services should be offered, according to a Cincinnati Bell spokesman.

"We take our customers' privacy very seriously," said Paul O'Brien, Cincinnati Bell's vice-president of marketing. "Our request includes options that address customer privacy issues as well as an education process to inform them."

The telephone company will offer a feature called Per Call Number Privacy that callers can use to block transmission of their telephone number on a per-call basis. There is no charge for this feature.

If customers want to block transmission of their telephone numbers on all outgoing calls, they can subscribe to a service called Per Line Number Privacy, which will cost \$1.60 a month for both business and residential customers.

In addition, Per Line Number Privacy will be available at no charge to customers that pay for (continued on page 20)

## TeleMate Fraud Fighter fends off potential hackers

By Bob Wallace  
Senior Editor

ATLANTA — Complementary Solutions, Inc. (CSI) has announced a new software module for its TeleMate personal computer-based call accounting system that alerts network managers to unauthorized calling.

With the new module, dubbed Fraud Fighter, the network manager sets thresholds based on call history for calling zones, trunks, key extensions and direct-inward system access (DISA) codes.

Once a threshold has been exceeded, the TeleMate system sends a message that is displayed on the net manager's computer screen. The system can send a message to an attached printer, sound an alarm or place a call to a beeper.

Fraud Fighter works without operator initiation or manual review. It also monitors internal DISA code abuse and can assist in identifying potential computer hacking by monitoring data extensions.

"One of the best ways to control fraud is to monitor for unusu-

al calling patterns that signal this kind of abuse," said CSI President David Couchman. "If these patterns are detected early enough, the fraud can be stopped."

Fraud Fighter is an add-on module to TeleMate, which runs on IBM PCs and compatibles with at least an 80286 processor and MS-DOS 3.0. The PCs must have at least 640K bytes of memory.

### Product pricing

Pricing for TeleMate begins at \$995. The Fraud Fighter software module costs \$2,000, which includes a one-year enrollment in the TeleMate Annual Support Plan. Users receive four tariff database updates a year, as well as telephone and on-line support when needed.

TeleMate products are developed, marketed and supported exclusively by CSI. According to the company, it has 3,000 TeleMate users worldwide.

For more information, call CSI at (404) 936-3700 or write the company at 4250 Perimeter Park South, Suite 200, Atlanta, Ga. 30341. ■

## FCC pushes up deadline for 800 portability

1985	Bell Atlantic Corp. asks FCC to open proceeding on 800-number portability.
1986	FCC issues notice of proposed rule making on 800 portability.
1989	FCC issues order on 800 portability; availability expected from RBHCs and major independents in mid-1990s. Several parties ask FCC to reconsider its order.
1991	FCC issues revised order that moves up 800 portability date and sets network performance requirements that local carriers must meet by that time.
1992	RBHCs and major independents file joint implementation plan for 800 portability but say they can't meet FCC performance levels by deadline. Later, RBHCs and major independents ask FCC for waivers from network performance requirements. 800 portability scheduled for March, 1993.

SOURCE: NETWORK WORLD

GRAPHIC BY SUSAN J. CHAMPENY

## Users, carriers fret about 800 portability

Questions and concerns about the FCC plan for 800-number portability come from all sides.

By Anita Taff  
Washington Bureau Chief

WASHINGTON, D.C. — Anxiety over the feasibility of getting 800 portability up and running by next March has grown so high that users and long-distance carriers are questioning whether the FCC should go forward with its current plan.

Two prominent user groups, the International Communications Association and the Ad Hoc Telecommunications Users Committee, last week were considering whether to ask the Federal Communications Commission to delay implementation of 800-number portability.

These groups were joined by the three major long-distance carriers in raising concerns about how 800 portability would be administered, what features would be available to users, how cutover to the new system would be accomplished and how net performance would be affected.

### Deadline too strict

The FCC specified network performance requirements the local carriers must meet, but the carriers balked, saying they could not meet the performance levels by the agency's March 1993 deadline. All of the carriers have requested waivers from those requirements, and FCC officials said they will rule on the waivers soon.

Users and carriers say 800-number portability will boost

competition, drive down prices and increase options by making it possible for customers to use one 800 number with multiple carriers. But there is little agreement on how to accomplish portability, and there are many concerns that cutting over to the required technology could effect network performance.

In order to make 800 numbers portable, local carriers must install databases to store information about how to route 800 traf-

The ICA and the Ad Hoc Committee were considering whether to ask the FCC to delay implementation of 800-number portability.

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fic. Users will be able to route traffic to various carriers according to the time of day, geographic area or other criteria.

Without the database to provide routing information, 800 numbers must be assigned to a specific carrier. Local carriers know which 800 numbers belong to which long-distance carriers and terminate traffic appropriately. (continued on page 20)

## Users, carriers fret about 800 portability

*continued from page 19*

ately. This prevents a user from being able to switch among carriers and keep the same 800 number.

But the database lookup envisioned for portability will introduce delay. Many fear it could double or triple post-dial delay, which is currently about two to three seconds. This could drive up costs for users and create problems with devices such as point-of-sale terminals that are pro-

grammed to disconnect if too long a delay is experienced.

### One step at a time

Although users are eager to make use of portable 800 numbers, they will probably not be able to cut over their entire 800 networks to portable numbers all at once. In FCC filings, both the Ad Hoc Committee — whose membership includes a number of large corporations — and First Financial Management Corp. (FFMC) — one of the nation's largest transaction processing providers — said that users need the abili-

ty to phase in 800 portability.

"For a huge number of applications for hundreds of users, a flashcut to a new [800] carrier on a nationwide basis simply is not feasible," the Ad Hoc Committee told the FCC in a filing last month.

As a solution, users are pressing for a feature known as area-of-service routing, which would allow customers to cut over 800 numbers to new carriers on a region-by-region basis. In its order on 800 portability, the FCC envisioned that carriers could offer a number of features like this, but it is not clear whether all carriers have

to provide it.

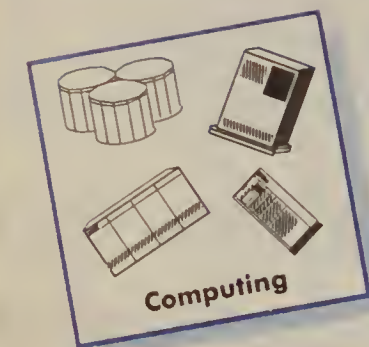
Both the Ad Hoc Committee and FFMC said that such features are critical to the success of 800 portability and, therefore, should be considered a basic part of the service rather than an enhanced feature that carriers are required to offer. Without features such as regional routing "users will no longer be encouraged to test and use new carriers and new carrier arrangements by migrating some of their 800 traffic to new and different carriers," FFMC said in an FCC filing.

Additionally, FFMC, AT&T, Sprint Corp.

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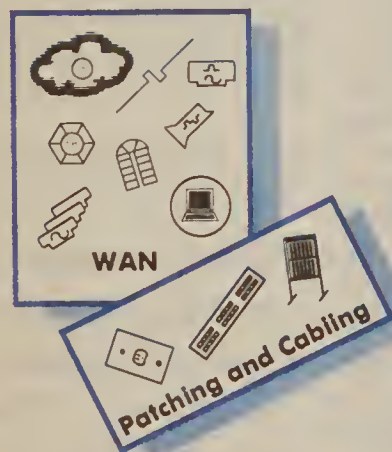
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“For a huge number of applications, a flashcut to a new [800] carrier on a nationwide basis simply is not feasible.”

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and MCI Communications Corp. raised questions about who will be empowered to arrange for changes in carriers for 800 traffic. The FCC must decide which parties, referred to as responsible organizations, will be allowed to request changes for users, they told the agency.

FFMC says users should be able to represent themselves in requesting 800 service changes. MCI, AT&T and Sprint have suggested that only purchasers of 800 access, typically large carriers, should be allowed to act as responsible organizations.

"If customers interact directly with the [local exchange carriers] to order or change their interstate 800 service, inter-exchange carriers will lose the ability to manage or control their networks and will be subject to interference by the LECs in their relationship with the customer," AT&T told the FCC in a filing.

Sprint suggests allowing a third-party entity, called the Number Administration and Service Center, to make changes in 800-carrier selection for users. ■

## Cincinnati Bell seeks OK to offer services

*continued from page 19*

unlisted numbers and request the privacy offering. Cincinnati Bell said 23% of its customers subscribe to unpublished service.

Call return, the other CLASS offering added in the amended filing, makes it possible to automatically return the last incoming call to the subscriber whether it was answered or not. Call return will cost business users \$6 a month and residential customers \$4 a month.

If the OHIO PUC grants Cincinnati Bell permission to offer CLASS services, the telephone company will begin a phased rollout, beginning within three to five months, which will take several years. Initially, about 60% of Cincinnati Bell's Ohio customers will be able to use the CLASS offerings.

The telephone company is currently working on the rollout plans for customers in Kentucky and Indiana. ■

# ENTERPRISE APPLICATIONS

CLIENT/SERVER AND ENABLING SOFTWARE: DISTRIBUTED DATABASE, MESSAGING, GROUPWARE AND IMAGING

## Worth Noting

“If an application takes two years to be developed, it's running at 0 MIPS, no matter what hardware platform it's running on.”

**Steven Jobs**  
Chairman and chief executive officer  
NeXT Computer, Inc.  
Redwood City, Calif.



D&B Software's Thomas Ball

## D&B Software exec details new client/server strategy

Ball sees timing as one of biggest challenges.

**Q** Dun & Bradstreet Software, a giant in the mainframe application software business, is now trying to reverse direction and capitalize on the rush to client/server computing before it passes them by.

Thomas Ball, D&B Software's director of product planning and marketing strategy for client/server tools and technologies, calculates that it will be three to five years before the majority of the company's 12,000 customers will start downsizing their applications from mainframes to client/server platforms.

Ball recently discussed D&B Software's strategy and timetable for client/server product shipments with *Network World* Senior Editor Wayne Eckerson.

### What is your biggest challenge in developing client/server software?

Timing is perhaps the biggest challenge — getting our client/server products to the market when the majority of our customers need them. While we can't meet the needs of users looking for full suites of client/server software today, we feel we will be ready when the majority of our 12,000 customers will be downsizing applications.

Our market research indicates that 60% of our customers are investigating client/server applications — 40% [of our customers] will implement them in the next three to five years, but only 20% are actively looking to buy client/server software today.

We are scheduled to release client/server versions of our

host-based financial applications in the first quarter of next year, and we are right on schedule. By 1994, just when users will want them, we will be shipping client/server versions of all our core host-based applications.

### Are customers more interested in purchasing client/server applications based on OS/2 or Unix?

There has been strong interest in our OS/2 decision support products [released last month],

**We** believe Unix is more scalable than OS/2 and has excellent price/performance.

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but we will focus on developing our core applications on Unix before OS/2, Windows NT, VMS or any other platform.

Many of our large customers are running high-volume transaction processing applications, and Unix is better geared to that environment. We believe Unix is more scalable than OS/2 and has excellent price/performance.

We actually have two Unix initiatives under way. One is our rightsizing campaign, in which we are essentially recompiling our host applications to run Unix in a terminal user environment. The other is our effort to build

(continued on page 26)

## Informix to use HP's OpenODB in OnLine

OnLine will provide object-oriented capabilities while offering access to relational data apps.

By Timothy O'Brien  
West Coast Bureau Chief

PALO ALTO, Calif. — Hewlett-Packard Co. last week announced it will license its object-oriented database, OpenODB, to Informix Software, Inc. to be integrated with Informix's OnLine relational database.

With OpenODB, Informix can allow users to realize the benefits of accelerated application development made possible by object-oriented technology while still being able to access and use existing database applications based on relational data.

“HP's OpenODB enables faster application development and lower maintenance costs and at the same time, protects existing database code, data and resource investments,” explained Mike Mathews, product marketing manager for the Distributed Object Computing Program at HP.

By using OpenODB with OnLine, Informix will provide its

customers a way to migrate to object-oriented technology while maintaining their investment in OnLine's relational technology.

OpenODB will be integrated into Informix's offerings as part of future releases of its OnLine database. Because Informix already offers its database on many leading Unix offerings, the joint development deal will result in OpenODB being available on Unix platforms other than just HP's HP-UX.

In addition, HP will also share with Informix its object-oriented SoftBench development environment, which can be used to build distributed object-oriented applications.

SoftBench will be integrated into Informix's OpenCase/Tool-Bus product.

HP's OpenODB is a fully functional object-oriented database management system that runs on top of relational databases on a

(continued on page 26)

## SuiteDOME offers easier application development

By Wayne Eckerson  
Senior Editor

LA MESA, Calif. — Suite Software, Inc. recently announced it has added object-oriented capabilities to its software development tool that lets users build and run distributed applications across multivendor hardware platforms and networks.

Suite Software's Distributed Object Management Environment (SuiteDOME) now comes with a library of object classes that makes it easier for programmers to access basic operating system services when building distributed applications in a multivendor environment.

The objects can be used to invoke services relating to nodes, processes, applications, users, files and directories. Previously, SuiteDOME required developers to write applications to an application program interface (API) written in C language. Now pro-

grammers use a simple English-language command to send a message to the appropriate object or objects, according to Don Middleton, president of Suite Software, based here.

For example, programmers can write “Get mynode” and “Get nodename” into application code, which allows an application to determine the name of the node on which it resides, Middleton said.

“We are trying to insulate the developer of distributed applications from the disparities of the various hardware and operating system combinations that sit on the network,” he said.

SuiteDOME is essentially middleware that hides the complexities and differences of underlying hardware, operating system and network components from the developer and user.

The software, which provides

(continued on page 26)

## Store & Forward

NeXT Computer, Inc. and Object Design, Inc. have announced an agreement to jointly develop new object-oriented storage and database technology that will improve object-oriented software development productivity and network utilization of distributed applications.

This new technology will provide a means for storing objects used in applications on a network and enable shared management, storage and retrieval of all data types, including audio, video and graphic data.

Under the agreement, Object Design will port ObjectStore 2.0, the most recent version of its object-oriented database product, to NeXT's Unix-based NeXTStep Release 3.0 operating system. This product, which will be available by year end, will be marketed and distributed by Object Design.

In a related announcement, Object Design and Progress Software Corp. announced a deal under which they will integrate the Progress Fourth Generation Language and the ObjectStore object-oriented database.

Development of a joint product has already begun and is expected to be available in the first quarter of 1993. No pricing is available yet. ■

# People have always b together. Unfo computing enviro


The good news, however, is there's a solution. Lotus Notes® software. A breakthrough technology that's helping organizations overcome the technological roadblocks found in most mixed computing environments, which often stop good ideas from ever going anywhere.

You see, Lotus Notes is a flexible workgroup computing environment that signals a better way for end users to work together...while giving IT and MIS professionals a better way to more effectively leverage their company's existing hardware, software and network investments.

Let's face it. Many companies have spent fortunes on technology over the years and have begun to wonder just how well it's paid off. With Notes, the benefits are immediate. Companies can finally begin connecting people and ideas for more informed decisions. Regardless of group size, location or network configuration.

What's more, Notes is an extremely flexible environment that makes the development and

deployment of all kinds of custom applications a relatively quick and easy process. Some typical applications include lead tracking, product planning, brainstorming, account management, reference libraries, call reporting, quality management and more. There are small and large



*"At Continental Insurance, we work with some very large accounts, where the level of service is critically important. We thought it'd be a great idea to develop an automated, daily checklist for our people to track the more than 170 tasks that a typical account requires. So we budgeted \$350,000, figuring it would take us at least a year. Then we took a serious look at Lotus Notes.*

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*Bill Sorrentino  
Senior Project Manager, Continental Insurance*




companies, in fact, that have bought Notes to solve a specific problem, only to discover that it answered other needs as well.

Lotus Notes runs on the most popular networks (Novell®, IBM®, Microsoft®, Banyan® and DEC™). And,

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*Lotus Notes is an innovative workgroup computing environment designed to increase*

# een open to working rtunately, their onments haven't.



in Windows™ and OS/2®. Just as we've done with our 1-2-3® spreadsheet, we'll soon have Notes running on all major platforms, including Macintosh® and UNIX®. Again the objective is to provide users with a seamless way of working together whether they're in the office or on the road. No matter what platform they use.

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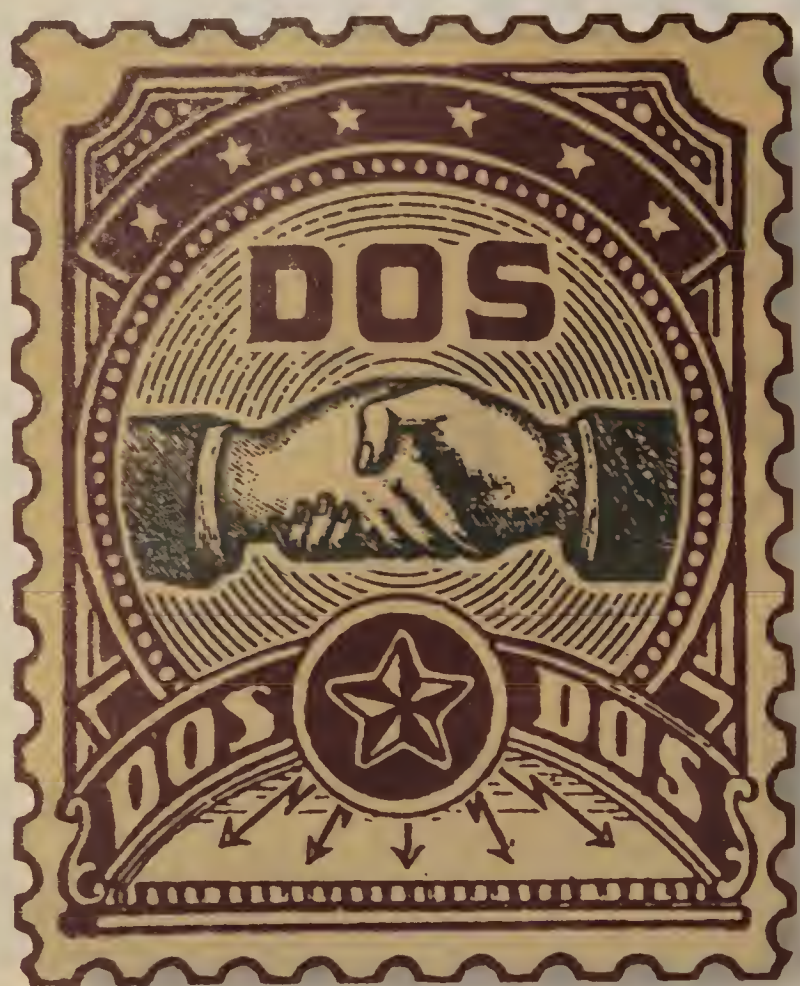
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frame mail systems such as IBM® PROFS® and offers gateways to public e-mail services such as MCI Mail®. And cc:Mail runs smoothly on any server or network operating system, in any configuration. All of which means it's easier for you to maintain, administer, and install. And put your faith in.

cc:Mail offers an impressive set of administration tools. Such as Automatic Directory Exchange, a product which automatically collects any changes made to the directory and updates the entire network. It's also the first package of its kind that's built on a new, fully



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messaging architecture. Which means it can accommodate 5 to 500,000 users. And grow along with your business. There's one more thing you should know: cc:Mail has won every major industry award, including InfoWorld's 1991 Product of the Year Award, Byte Magazine's 1992 Annual Reader's Choice Award and LAN Times 1992 Reader's Choice Award.

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**Lotus** cc:Mail

## Exec details new strategy

*continued from page 21*

true client/server applications running on Unix.

Our rightsizing campaign is an attempt to address the needs of our customers who are eager to move their host-based applications to Unix to get better price/performance.

This month, we begin beta-testing the first of our core host applications on Unix processors from Data General, ILC, Inc., Hewlett-Packard and Digital Equipment Corp. These applications will be available by the first quarter of 1993.

At the same time, we are rebuilding all our core applications — finance, materials management, human resources and manufacturing — to run as client/server applications on Unix. The first releases of those applications will be ready by the first quarter of 1993.

### Will these products be robust enough to meet users' needs?

The first Unix client/server products will offer the basic functionality of our mainframe applications for global markets. Further releases will add features, such as support for industry-specific functions, that our host-based products currently have. By the end of 1994, we should have a robust suite of client/server software to match our host software.

### What portion of your customer base is most interested in implementing client/server applications today?

Typically, the companies with smaller mainframes that are running less complex applications. Those are the ones that are scrapping their mainframes and putting client/server applications in place running on Unix or OS/2 platforms.

The companies with large mainframes have too much money invested in their hosts to scrap them outright. They also typically use the mainframes to support high-volume transaction processing environments that client/server platforms aren't ready to handle yet. They will be most interested in using our client/server applications as a way to tap into mainframe data.

### Is the lack of client/server management tools keeping users from downsizing their applications?

The industry as a whole needs to put in place an adequate infrastructure for operating and managing client/server environments. The tools and procedures for managing client/server environments just aren't there yet.

We are hoping that third parties emerge to provide these tools [since] we don't plan to build them ourselves.

### Do you plan to provide tools that enable users to modify your applications to meet their needs without fundamentally altering the source code so you will still be able to support and maintain the software?

The promise of that comes when you can build truly object-oriented software and have a full suite of [computer-aided software engineering] tools that can support that. I don't think we are quite at that stage today, but that certainly is our vision. [However] I don't think we'll get there in our

**T**he industry as a whole needs to put in place an adequate infrastructure for operating and managing client/server environments.

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first few releases of our applications. Down the road, maybe mid-decade, we'll get there.

Right now, however, we are using tools from Sybase and Powersoft that will allow us to take an object-oriented approach to designing applications. We also have developed an enterprise model that simulates a business operation according to the interaction of its core components. Our goal is to create objects that represent all the elements within the enterprise model. Once we have these objects, it will be more possible for customers to customize our applications by building objects that inherit the characteristics of our objects that can perform the tasks unique to their environments.

Right now, however, we don't have all the tools needed to build a truly object-oriented environment.

### How much money and resources has the company invested in the client/server effort?

It's difficult to tell. But 25% of our revenue goes into research and development. A few years ago, that money was spent primarily to develop terminal-based

applications, but now a majority of that money is going toward client/server development. We are still doing updates to our mainframe software, but mostly, it is minor fixes and regulatory updates.

We have brought some outside programmers to seed our existing staff, and we have spent a lot of time training our programmers to work in the new environment.

### Many users are finding it more difficult and costly than they had expected when migrating to client/server computing. Is the same true with D&B Software?

Last month, we released our first client/server products — SmartStream, InterQ and Financial Stream Analysis under OS/2 and Windows. Together, the three products enable users to access data from host computers for decision support applications. The products were built using PowerSoft [Corp.] PowerBuilder front-end development tool, Sybase [Inc.] SQL Server database and Cognos [Inc.] PowerPlay analysis software.

It took less than a year to de-

velop those products, and we are shipping them when we expected to. Our work on the other platforms is going according to schedule, as well.

### What support programs will you implement to allow users to get help when they need it?

We plan to be a single point of contact for products that form the component parts of our client/server products. For our current set of products, we will provide support for PowerBuilder, PowerPlay and SQL Server. That's something new to us.

We have also joined with hardware companies, such as HP and Data General, and management consulting firms to help customers figure out which applications to distribute and how, reengineer existing business processes using client/server applications and choose the appropriate networks and hardware components to use.

### The man responsible for moving D&B Software into client/server computing, John Landry, is now the chief

technology officer at Lotus Development Corp. Was his departure a setback for the client/server initiative?

Landry set the vision and path, and he did a good job in this area. I think we have done a good job carrying forth his vision and executing the client/server plan.

### How are you deciding which parts of an application to keep on a client machine and which to run on a server?

One of the reason we are committed to using Sybase's SQL Server as the back end of our client/server applications is because we agree with Sybase that most of the intelligence in an application should reside on the server. We believe that only the presentation and minor editing functions should be carried out on the client. We feel this provides the highest level of performance and security.

We are taking advantage of Sybase's architecture because we believe that the complex transaction processing applications users will eventually want to run on client/server platforms are best supported in this manner. ■

## Informix to use HP's OpenODB

*continued from page 21*

server. Originally designed to sit on top of HP's AllBase database, OpenODB was designed to be open so it could be ported to other databases.

Other database ports are expected in addition to Informix's OnLine database.

Because OpenODB runs on top of a relational database, it can be integrated with third-party databases and tools, as well as provide access to data or applications not in the database.

In addition, OpenODB provides similar capabilities to a relational database in that it allows database functions such as online backup to be made without stopping applications or affect-

ing existing data.

According to HP's Mathews, OpenODB enables new, complex business applications to be developed and maintained at a fraction of current development costs because more of the application — including reusable code, relationship definitions, work flow processes and data — is stored in the database itself.

Applications that benefit the most from object-oriented database technology are those that use multimedia data such as video or voice, have complex relationships among the data, run in rapidly changing environments, or integrate multiple applications and data.

With OpenODB, HP is targeting large, commercial applications that need integration with older, host-based legacy applications rather than focusing on more specialized niches, such as computer-aided design, that are being addressed by some of the newer, higher performing object-oriented databases being offered by smaller start-up companies.

HP and Informix also plan to announce later this year further sharing of object-oriented technologies, which will most likely be additional pieces of HP's distributed object-computing strategy beyond OpenODB and SoftBench.

HP and Informix will announce more specifics on pricing and availability in a few months. ■

## SuiteDOME eases development

*continued from page 21*

various services such as messaging, naming, security and data access, is used both to develop and run distributed applications. As production software, SuiteDOME resides on every node in a network that will be running applications supported by the SuiteDOME environment.

Currently, SuiteDOME is available for Digital Equipment Corp. VAX processors running VMS, Sun Microsystems, Inc. SPARCstations running Solaris 1.0, IBM RISC System/6000 computers running AIX, NeXT, Inc. systems running NeXTStep and any com-

puters running Unix System V.3. By year end, Suite Software will add support for DOS, OS/2 and Unix System V.4.

The software also supports applications distributed across a variety of networks, including DEC's DECnet, Transmission Control Protocol/Internet Protocol and dial-up protocols. Support for X.400, X.25, Novell, Inc.'s NetWare and IBM's LU 6.2 protocols will be added by the end of the year.

Suite Software is working to make SuiteDOME fully conformant to the Object Management

Group's Common Object Request Broker Architecture (CORBA) Middleton said. CORBA is a standard mechanism that allows applications to locate and invoke objects distributed across a net in order to perform a specific task.

In addition, future releases of SuiteDOME will contain objects that encapsulate a variety of network services and resources as well as database functions.

SuiteDOME, which was announced in January, is priced by the number of concurrent users per node. Pricing ranges from \$500 per node for simple configurations to \$75,000 per node for users with multiple hardware platforms, databases and nets. ■

# INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

## Worth Noting

**A**lternative access carrier Metropolitan Fiber Systems, Inc. recently was granted permission by the Illinois Commerce Commission to resell Illinois Bell Telephone Co. and Central Telephone Co. of Illinois local switched services. MFS has petitioned the FCC to let alternative access carriers get into the switched services market nationwide.

## HP test system checks for National ISDN 1 compliance

Should help vendors prepare for TRIP '92 demo.

By Ellen Messmer  
Washington Correspondent

WASHINGTON, D.C. — Hewlett-Packard Co. next week will release an ISDN test system that allows customer premises equipment to be evaluated for conformance with the National ISDN 1 specification.

The HP PT500 tester arrives in time to let customer premises equipment vendors run their Integrated Services Digital Network products through strenuous testing to ensure conformance with the specification. National ISDN 1 is the Bell Communications Research specification carriers will begin to implement this November to overcome ISDN switch incompatibilities.

During the Transcontinental ISDN Project '92 (TRIP '92) demonstration Nov. 16-20, user sites across the country — such as Eastman Kodak Co. in Rochester, N.Y., and Schindler Elevator Corp. in Morristown, N.J. — will showcase Basic Rate Interface (BRI) ISDN applications using National ISDN 1 equipment.

TRIP '92 will link islands of ISDN for the first time, said Pauline Hale, marketing communica-

tions manager at HP's Idacom Telecom Division in Edmonton, Alberta, which sells the HP PT500 tester for National ISDN 1.

Several American local and long-distance carriers and Telecom Canada plan to upgrade their AT&T and Northern Telecom, Inc. central office switches to support the common National ISDN 1 BRI specification. This change will be part of a permanent ISDN infrastructure, and although it will not convert the U.S. to a common ISDN structure overnight, it will mark the start of the long, slow march to full ISDN interoperability.

### Tester's role

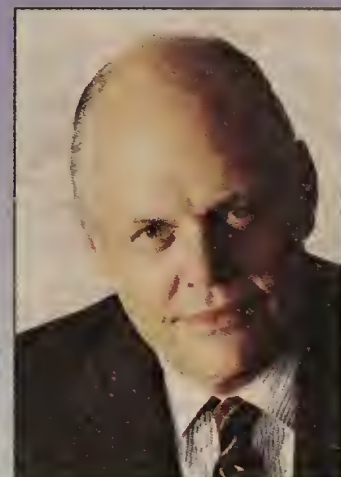
Customer premises equipment vendors intending to market National ISDN 1 handsets and adapter cards need a testing system to ensuring multivendor interoperability.

The HP Idacom National ISDN 1 tester answers a call from the customer equipment premises vendor community, which last winter complained that TRIP '92, organized by the Corporation for Open Systems International and

(continued on page 28)

"I've had a long and satisfying career at Digital, and it's time for the next generation of management to assume leadership."

Kenneth Olsen  
President and CEO  
Digital Equipment Corp.



## Industry looks back on legacy of Olsen

Retirement of DEC's commander in chief prompts questions about the past, forecasts for the future.

By Bob Brown  
Senior Editor

MAYNARD, Mass. — Kenneth Olsen's imminent retirement as president and chief executive officer of Digital Equipment Corp. has given industry observers pause to reflect on Olsen's major contributions to the network industry and wonder about whether a struggling DEC can regain its luster.

Although DEC's financial plight is worsening, Olsen's leadership over the years at DEC and in the industry cannot be overlooked, analysts and users said.

An entrepreneurial engineer, Olsen built DEC on the concept of networking, driving the growth of the industry in the process. DEC was a top innovator in networking from the introduction of the market's first minicomputer in 1963 to its role in the development of Ethernet in 1980.

Olsen's legacy is that "he pulled computers out of the data center and introduced distributed computing and the concept of the network as a computer," said Chris Christensen, research director for multiuser systems at International Data Corp., a Framingham, Mass., market research firm.

As the leader of DEC, Olsen was first and foremost an engineer, a fact that analysts and users alike respected. "If I wanted a marketing company, I'd go to IBM," one large DEC customer said privately.

Ultimately, though, it may have been Olsen's lack of marketing savvy that led DEC to the fi-

nancial predicament it is in today, said Janet Hyland, director of network strategy research at Forrester Research, Inc., a Cambridge, Mass., market research firm. "He was involved in a lot of product decisions at a fairly operational level," she said. "And nobody was willing to argue with him because he was in charge."

It is widely believed that DEC's financial crunch led its board to ask for Olsen's retirement, effective Oct. 1. A week later, the company reported a quarterly loss of \$1.85 billion — \$1.5 billion of which was a restructuring charge taken to pay for further layoffs and plant closings.

The board subsequently approved Olsen's handpicked replacement, Robert Palmer, another engineer. Palmer was instrumental in cutting costs at DEC's manufacturing facilities and reviving its semiconductor operations.

It remains to be seen whether Palmer can turn DEC around and restore innovation. The company is still smarting from its late entry into the personal computer market, and some of its network efforts, such as its network management system, have evolved slowly, meeting with only marginal success.

Some observers blame Olsen for the company's malaise, citing his loyalty to DEC's proprietary VMS operating system. But given that many users have so much invested in DEC products, most seem willing to give Palmer a chance.

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## NET FINANCIALS

**Compression Labs, Inc.**, a San Jose, Calif., maker of videoconferencing equipment, reported revenue of \$26.9 million for the second quarter ended June 30, up 65% over the \$16.3 million in revenue earned during the second quarter last year. However, the company was socked with a \$2.2 million loss for the second quarter, a reversal from earnings of \$700,000 in the second quarter last year.

John Tyson, president, chief executive officer and chairman of Compression Labs, said that while revenues were at record levels, earnings were hurt by lower than anticipated shipments of high-margin products. Some customers deferred orders because of a delay in availability of the company's CCITT H.261 (Px64) videoconferencing standard software, which did not come out until late in the quarter, he said.

**Microsoft Corp.**, the Redmond, Wash., software giant, continued to roll, posting fourth-quarter revenue for the period ended June 30 of \$815 million, up 55% over the \$527 million reported for the fourth quarter last year. Earnings increased 52% from \$138 million in the fourth quarter last year to \$210 million in the fourth quarter this year.

Fiscal 1992 revenue grew about 50% over 1991 revenue of \$1.8 billion to \$2.8 billion. Earnings for fiscal 1992 increased to \$708

(continued on page 28)

## People & Positions

**Charles Feld**, formerly vice-president of management information at **Frito-Lay, Inc.**, has joined **Perot Systems Corp.** as vice-president and a member of the board of directors. Feld will market Perot Systems' range of operational services as a one-stop resource for corporate information systems.

**Arthur Bushkin**, formerly vice-president and a partner at **A.T. Kearney, Inc.**, has joined **Bell Atlantic Network Services, Inc.** as president of information services. Bushkin will be responsible for formulating and directing Bell Atlantic's strategies for providing information services to business customers.

**Robert Payne**, formerly head of German operations at **Dowty Communications, Inc.**, has joined **Bytex Corp.** as managing director of European operations and general manager of **Bytex GmbH**. In his new position, Payne will be head of activities at the new European Bytex headquarters in Frankfurt, Germany. □

# Research report calls for second telecom divestiture

Says RBHCs should be separated from LECs.

By Ellen Messmer  
Washington Correspondent

NEW YORK — Research firm New Networks Institute last week released a report charging the regional Bell holding companies with favoring their investors over customers.

The report, called "10 Years Since Divestiture," asserts that local service charges have risen 315% nationwide in the last decade since the dismantling of AT&T, with the Bell companies using their profits to purchase real estate, computer firms and telecommunications firms abroad. The report calls for a second divestiture in which the parent holding companies would be separated from their local exchange companies.

"We need to examine whether these companies are utilities or just for the shareholder," said Bruce Kushnick, president of New Networks, the research firm he founded after leaving Strategic Telemedia, where he was president. Kushnick said the primary

finding of his study is that the RBHCs are focusing on their investors to the detriment of residential and business utility subscribers.

Kushnick said his research began with a key question: "Why did a call to Connecticut from New York City handled by New York Telephone cost almost 95% more than a call from New York, handled by AT&T, to California?"

His report surmises that the lack of competition in local service has allowed the Bell companies to triple their prices, despite the 10% increase in the number of local lines in the last five years.

Kushnick said his research, the result of an examination of thousands of documents, including telephone bills, tariffs and state and federal regulatory reports and Bell company statements, concludes that the Bell companies have used these LEC profits to fund their overseas operations to the tune of \$11.3 billion since 1989.

The report said staff at the

LECs has decreased almost 7% in the past five years, while the total RBHC staffs have increased more than 20%. It accuses the RBHCs of neglecting to upgrade the net infrastructure in favor of investments in nonregulated ventures.

Kushnick hopes his report will shift the focus from freeing the Bells to divesting them. "We believe that instead of allowing the [RBHCs] into other services, such as long-distance and manufacturing, the real discussion should be focusing on exploring the dismantling of monopolies, and that excess profits be returned to the consumer and business, either in prices or in creating the next generation of network," the report concludes.

Kushnick also faults the state and regulatory system, which he claims create a patchwork quilt of contradictions and omissions that have allowed LEC prices to rise. He said one answer to this problem of coordinating state and federal regulation would be a new government agency to facilitate coordination and aid regulators in creating "coherent, enforceable policies."

Kushnick promises four more reports on the RBHCs by October, including one on telephone charges in the U.S. and another on consumer attitudes. ■

## System checks for compliance

*continued from page 27*

Bellcore, was moving ahead without adequate means of conformance testing.

In February, during the National ISDN CPE and Application Developers Workshop in Huntsville, Ala., Bob Larribeau, director of product planning and marketing at Fujitsu Network Switching Division's ISDN division, called testing ISDN terminals "a long drawn out job that constitutes one-third of the development cycle."

At that time, vendors could only go to Bellcore's in-house conformance test center for National ISDN 1 testing.

The HP Idacom National ISDN 1 tester, a software package for the HP PT500 tester, will enable vendors to test products in-house. The PT500 tester can put ISDN equipment through 1,414 test cases in Layer 2 of the Open Systems Interconnection model and 241 test cases for Layer 3 basic call control.

Hale said use of the PT500 in-house during the development phase of a product will cut down on the amount of time required to perform conformance testing in a third-party lab.

One third-party lab, CDA, Inc. in McLean, Va., plans to use the PT500 for testing National ISDN

1 products. But Kevin Murray, vice-president of OSI services at CDA, said his company first would like the National Institute of Standards and Technology (NIST) to clarify its direction on National ISDN 1 testing for the government.

### Government backing

The market for National ISDN 1 products and services would be greater if the government stood behind National ISDN 1 as a government requirement. ISDN is included under the Government OSI Profile (GOSIP) Version 2.0 requirements which take effect this October, but NIST has not yet stipulated any specific version of ISDN as a federal purchasing requirement. Last week, NIST officials said there will not be any ISDN conformance test program for GOSIP Version 2.0. In addition,

the government intends to back a different version of ISDN.

"The government is not endorsing National ISDN 1," noted David Su, manager of advanced communications at NIST. Su said NIST plans to include the ANSI standards for Basic and Primary Rate Interface in a government standard expected to be released early next year. "[National ISDN 1] is not identical to the ANSI standards," he said.

Six months after NIST's proposal on ISDN becomes a Federal Information Processing Standard (FIPS), government users will have to purchase services conformant with the FIPS. While Su said National ISDN 1 is not totally incompatible with the upcoming FIPS requirement, it appears the U.S. has not yet laid to rest the troubling question of the flavors of ISDN. ■

## Net Financials

*continued from page 27*

million, up 53% from 1991's \$463 million.

**NetFRAME Systems, Inc.**, a Milpitas, Calif., superserver vendor, announced second-quarter revenue for the period ended July 3 of \$9.1 million, more than double the \$4.5 million in revenue posted in the same quarter last year. The company reversed a

loss of \$1.2 million in the second quarter last year to a profit of \$581,000 this quarter.

**Optical Data Systems, Inc.**, a Richardson, Texas, wiring hub vendor, reported second-quarter revenue for the period ended June 30 of \$12 million, up 48% from revenue of \$8.1 million in the second quarter last year. Earnings climbed to \$1.2 million from \$165,000 in the second quarter of 1991. ■

## DEC's network time line

1957	DEC opens in a converted Maynard, Mass., wool mill with 3 employees. Has first-year revenue of \$94,000.
1963	Introduces PDP-5, world's first minicomputer.
1975	Announces its Digital Network Architecture
1978	Launches DECnet Phase II, which enables resource sharing among DEC computers and operating systems.
1980	DEC, Intel Corp. and Xerox Corp. cooperate in Ethernet LAN project; DEC introduces DECnet Phase III.
1982	DECnet Phase IV integrates DECnet, Ethernet and X.25 protocols.
1986	Announces DECconnect wiring strategy and related products. Introduces Network Application Support (NAS) multivendor LAN software; unveils Local Area VAXcluster systems, extending distributed computing to the work group.
1987	Announces plans for DECnet Phase V, migrating DECnet products to full compliance with the OSI model.
1988	DEC and Apple Computer, Inc. announce joint development pact to link Macintosh PCs and AppleTalk networks with VAX computers and DECnet nets. DEC enhances NAS to integrate DOS, OS/2 and Unix systems into DECnet networks. DEC and 6 other computer vendors announce formation of the Open Software Foundation, Inc.
1991	DEC and Microsoft Corp. ally to allow Microsoft Windows users to exchange data with LAN servers running DEC's Pathworks; DEC introduces 5th generation of DECnet under the Advantage Networks umbrella, which includes TCP/IP support.

SOURCE: DIGITAL EQUIPMENT CORP., MAYNARD  
GRAPHIC BY SUSAN J. CHAMPENY

## Industry looks at Olsen legacy

*continued from page 27*

"I think we're going to see even more of an emphasis on networks by DEC," said Terry Shannon, an independent consultant based in Ashland, Mass., who follows the DEC market. "Palmer is not a so-called VMS bigot. That means good things for open systems, which translates easily into networks."

Shannon said DEC's fundamental technology is strong and he expects the company will attempt to back it up with a reinvigorated marketing effort.

"Olsen is the gentleman who once said that 'We would never market our products like soap powder,'" Shannon said. "Now that he will no longer be calling the shots, you may see more emphasis on getting the word out. It's great to have a vision, but if you cannot articulate it, you are still flying blind."

Christensen said he is not convinced that Palmer will revive DEC's marketing efforts. "I really wonder whether Palmer's semiconductor and hardware background won't mean that networking gets the short shrift," he said. "Then again, he may come in being more pragmatic about supporting protocols and coming out with network management products that are not VAX-centered."

Some customers said any change in DEC's strategy may be coming too late.

Don Zana, director of computing resources and technology at Teledyne Brown Engineering in Huntsville, Ala., said his company is a longtime DEC customer. The company went with DEC ear-

ly on because of DEC's adherence to industry standards and its stable operating system. But DEC has been slow to respond to its need to migrate to microcomputer-based local-area networks.

"Our strategy is to have several critical applications that will stay on the DEC systems in the data center and for the indefinite future, to move everything else onto the network," Zana said.

He said he has mixed feelings about DEC's newer network products. Teledyne Brown plans to use the DEC Management Control Center integrated net management system as the centerpiece of its overall net management strategy, he said. But users complained of slow response time when using DEC Pathworks-based LANs.

"DEC has always been a very cooperative vendor, but I just find that the solutions they have now aren't where my users have moved to," Zana said.

One user who asked not to be named said he is not surprised that DEC has failed to make it in hot market segments, such as the router and wiring hubs markets.

"DEC is an architectural company and doesn't do anything unless it does it the right way, which is a good intention," he said. "Others are willing to be in front and hack things a bit and beat companies like DEC to the market. Unfortunately, with DEC being a large company, they can't compete in niche markets well."

Forrester's Hyland said she expects DEC will ultimately break itself into more market-specific business units to make the company more competitive in emerging and niche markets, similar to what IBM did recently. ■

# MANAGEMENT STRATEGIES

ENTERPRISE NETWORK STRATEGIES, USER GROUPS AND MANAGING PEOPLE AND TECHNOLOGY

## Worth Noting

**E**xecutives waste an average of six weeks per year trying to find items that have been misplaced, misfiled or mislabeled, according to a survey of 200 executives by Accountemps of Menlo Park, Calif.

## Manager Minutes

The **Electric Power Research Institute (EPRI)** will hold the second meeting of the Manufacturing Message Specification (MMS) Forum Sept. 23-24 in Minneapolis.

The workshop will include an overview of MMS, an Open Systems Interconnection application-level protocol intended to ensure compatibility of factory-floor programs. For more information, call Larry Carmichael at the EPRI at (415) 855-7982.

The **Technology Transfer Institute** is holding a conference titled Building Client/Server Systems for Business Applications in Washington, D.C. Sept. 14-16. The conference will focus on the management, business and technological challenges of building client/server computing environments. For more information, call the institute at (310) 394-8305.

The **META Group** will hold its second annual Application Development Strategies conference, titled Enterprise Reengineering Using Next-Generation Applications, Sept. 14-16 in Tempe, Ariz.

This year's conference is designed to help users understand downsizing technologies. For more information, contact Robert Stockton at (203) 226-6382. ■

## Courses teach ropes of multivendor nets

Students at UNH Research Computing Center learn to design, troubleshoot Ethernet networks.

By Joanne Cummings  
Senior Writer

DURHAM, N.H. — Training network staff in the black art of designing and troubleshooting multivendor networks can be daunting, but the Research Computing Center at the University of New Hampshire is offering two courses that may help.

The center's intensive three-day courses stress a common-sense approach to designing and building multivendor Ethernet networks and thinking through network problems.

William Lenharth, director of the center, said that although people charged with designing and troubleshooting networks usually have a computer science or electrical engineering background, "that doesn't seem to prepare them well for the prob-

The class covers the different types of cabling media currently available, the pros and cons of each and how to connect different kinds of stations to the network. Students are also taught how to track individual connections throughout a building.

The course takes place in the building that houses the center's interoperability lab, a vendor-funded facility that tests for interoperability among different vendors' Ethernet products.

The building has been wired with every type of cabling media — thick net, thin net, 10Base-T, fiber — in order to support the varied functions of the lab. This provides workshop students with hands-on experience in a varied real-world environment, Lenharth said.

In the next part of the course, students attempt to solve a theoretical network design problem. They are asked to design a network for a fictitious four-story building.

"The problem is purposefully vague," Lenharth said. "We hope to teach them to work through the problem by asking questions and through discussion."

In the last part of the course, students are given the resources of the interoperability lab to solve problems they have encountered in designing their own network, he said.

The second course is a higher level offering designed to teach proven network troubleshooting techniques. It walks students through the process of learning a network's topology: its backbone, vertical and horizontal cabling media; hardware components such as transceivers, repeaters, bridges, routers, gateways and stations; and various application software including Network File System, File Transfer Protocol and Telnet.

The class also addresses how to locate network faults using the Open Systems Interconnection model as a framework, how to determine the extent of a fault and how to zero in on the faulty component. Students are then introduced to different types of test

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**“We teach them how to think ‘networking,’”**  
Lenharth said.



lems of networking. We teach them how to think ‘networking.’”

When faced with a problem, for example, one tendency is to immediately blame software or reach for a troubleshooting tool such as an analyzer. Most problems, however, can be traced to something as simple as a disconnected wire, he said.

The first course advances students through the various stages of designing a multivendor Ethernet according to standards. It shows them the most efficient way to solve their networking problems with a heavy emphasis on cost containment and budget planning.

“We emphasize adherence to standards,” Lenharth explained, “because lack of compliance will end up costing you in the long run.”

## The cost of implementing computer-based imaging

Total average cost: \$600,000



Figures are based on a survey of 400 corporations and government agencies.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: DELPHI CONSULTING GROUP, INC., BOSTON

## MANAGEMENT INSIGHTS

BY ERIC SCHMALL

## Tips for overburdened telecom managers

**W**ho would have guessed that when networking became universally hailed as the center of the information age, telecommunications managers would be given orders to reduce staff?

But that's just what's happening in today's sour economy. And with a record number of tasks demanded of them, smaller telecommunications units have had to learn to be especially efficient with their time. The challenge facing all of us is how to maximize productivity.

The richest load of hidden time can be discovered in the simplest of places — in everyday routine processes. Many of these once had a useful function but are now performed more as rituals than anything else. Tasks such as daily status meetings, routine reports and "required" operational reviews accumulate over time, and none ever disappear. They create a serious drag on the entire department, subtly diminishing its overall effectiveness.

But how do you stop this process? First, list every report, meeting and action required of the team. Next, make an estimate of the time each takes in

preparation and execution. Then comb through them to ascertain if they can be limited or eliminated entirely.

Where you used to issue written reports, see if you can transform them into something less time-consuming such as an oral report or a voice mail summary. Maybe you can totally eliminate some. One quick way to find out: Stop issuing them, and see if anyone complains. If you don't hear any grumbling, no one was reading them anyway.

Look at the root cause of the meetings you call or are called to attend and propose other ways to share the information or make the decision.

Stop automatically attending every meeting to which you or your staff are invited. Find out from the originator why they invited you before you make any commitment of your time. If you feel you must attend, ask that they cover the telecommunications issues first so you don't have to stay for the whole meeting.

Use your vendors to shoulder some of the load. For instance, don't ask your staff to produce reports on systems availability.

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## HIGH-SPEED NETS

BY TOM FERMAZIN

# Users don't always require higher speed networks

Many networking pundits think that Parkinson's Law, which tells us that work expands to fill the time allotted to it, also applies to bandwidth. Give users more bandwidth, and they'll find a use for it. But given the advances in data compression and techniques for optimizing network applications, the need for information superhighways becomes harder to justify.

Of course that's not the story you'll get from bridge, router, fiber-optic cabling and network operating system vendors, or public and private network service providers. These vendors and carriers are the loyal proponents of this twist on Parkinson's Law and the true beneficiaries of higher speed networks. Last year's technology is never as profitable as this year's newer, faster version.

Don't get me wrong. I don't subscribe to the Luddite philosophy that opposes technological change. Carrier pigeons are messy and unreliable, and 50-baud TWX is thankfully relegated to the history books. I just want to know that the money my company and others spend on increasing bandwidth through upgrades to frame relay, Fiber Distributed Data Interface or Asynchronous Transfer Mode will be well spent.

▲▲▲

Ethernet's 10M bit/sec is ample capacity to quickly transfer most files, including large spreadsheets, over a local-area net. What benefit would increasing that bandwidth tenfold do for us? Graphics, pictures, charts, images, maybe video — there's a lot of bandwidth needed there. I agree that these data-intensive applications will eventually make the personal computer/workstation look more like an interactive television, but that doesn't necessarily justify gigabit-per-second networks.

Consider the evolution of videoconferencing. Not long ago, 90M bit/sec was required to transmit pictures between two video coder/decoders. Today, 112K bit/sec is acceptable for most business meetings, and many argue that reasonable quality can be attained at speeds as low as 56K bit/sec.

The magic behind this bandwidth reduction is the compression algorithm, which uses arithmetic formulas that encode data or voice signals into fewer bits per second than would typically be required. Voice once chewed up 64K bit/sec until adaptive differential pulse code modulation cut that in half. Some compression algorithms reduce the bandwidth needed for voice to as little as 8K bit/sec. And in data transmission, various schemes, such as Trellis coding, have boosted throughput over analog lines. Development of even more efficient compression algorithms will likely continue.

There's plenty more a user can do to be bandwidth-efficient, such as replacing a simple file server with a data base server. With a file server, LAN users seeking one piece of information must download an entire file and rely on their PC to sort through it. Data base servers, on the other hand, sort through the file and transmit only the requested information to the PC.

Our demand for bandwidth will continue to grow, but let demand drive bandwidth, not vice versa.

*Fermazin is a technology analyst at Amoco Corp. in Chicago.*

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Bob Brown — Industry Update  
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Michael Cooney — Data Net Architectures  
14701 Bentley Square  
Centreville, VA 22020  
Phone: (703) 830-8138  
Fax: (703) 830-7963

Caryn Gillooly — Local Networking  
5423 Gladewright Drive  
Centreville, Va. 22020  
Phone: (703) 266-1537  
Fax: (703) 266-1543

### Senior Writers

Joanne Cummings — Management Strategies  
67 Highgate Road  
Marlborough, MA 01752  
Phone: (508) 481-6061  
Fax: (508) 485-5809  
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### Staff Writer

Skip MacAskill — Internetworks

### West Coast Bureau

Timothy O'Brien  
Bureau Chief/Enterprise Applications  
Phone: (415) 771-3530

Margie Wylie  
Senior Editor/Local Networking  
2088 Union Street, Suite 2  
San Francisco, Calif. 94123  
Phone: (415) 771-4103  
Fax: (415) 771-2817

### Washington D.C. Bureau

Anita Taff  
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Ellen Messmer — Industry Correspondent  
National Place  
1331 Pennsylvania Ave. NW, Suite 505  
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Framingham, Mass. 01701

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MCI Mail — 390-4868

Fax: (508) 820-3467

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## EDITORIAL

# Net management vision starts with end users

Winston Churchill once said, "It is always wise to look ahead but difficult to look further than you can see."

That saying should echo in network and MIS managers' minds as they contemplate strategies for managing enterprise-wide networks in the future.

The temptation for many is to view historical trends and adapt time-tested processes for managing corporate nets to managing evolving client/server-based distributed networks.

However, according to speakers at *Network World's* Managing Enterprise Networks conference last week, companies need to devise alternative approaches to managing their distributed nets. That would include enlisting input from end

users about their needs.

The way an organization approaches the design, implementation and operation of network management can make or break the quality of the network service and, ultimately, a company's ability to compete, according to Mary Johnston Turner, a principal at Northeast Consulting Resources, Inc.

As networks evolve, net management strategies need to be tightly integrated with business objectives to ensure greater levels of reliability and service quality, she says.

Today, companies are deploying strategic business applications down to local pockets of computing. As a result, having capabilities such as rapid application deployment, instantane-

ous node moves, changes and deletions, and on-demand provisioning of network capacity will be critical to a company's ability to respond to market conditions.

The best way to ensure that, Turner says, is to get end users and network personnel to work together to develop net management practices. What should be avoided at all costs is inflexibility to the possibilities of new processes or ideas offered by end users.

Should that type of closed thinking be permitted, some network managers may come to rue another of Churchill's famous sayings: "If we open a quarrel between the past and the present, we shall find that we have lost the future." ■

# OPINIONS

## SECURITY PERSPECTIVE

BY M.E. KABAY

### Big Brother: Don't interfere in telecom security issues

How would you feel about a law that forced American automobile manufacturers to make only slow cars so police vehicles could be guaranteed to be faster? Sound crazy? This type of twisted reasoning is behind two current U.S. government proposals that would weaken network security. Net managers must fight these ill-advised proposals.

Expressly, users should fight a proposed law the Senate Judiciary Committee is reviewing. This law would force all public data network operators as well as data encryption software and hardware manufacturers to guarantee that encrypted communication can be deciphered by specified authorities.

Users should also fight the Federal Bureau of Investigation's attempt to have the Federal Communications Commission bar manufacturing and use of communications equipment that can't be wiretapped on demand.

Both proposals would force network managers to use only those security tools that could be defeated by government operatives. If an encryption method could not be cracked, it would be illegal. If a communications channel could not be broken into, it would be forbidden.

The proposed law now in front of the Judiciary Committee would force manufacturers to offer weaker data encryption products, which consist of an encryption algorithm and a key for decryption. Once data is encrypted, the garbled text cannot be deciphered without the original key.

Brute force methods can theoretically determine the key by searching through all possible keys. However, without a great deal of time and use of supercomputers, it's practically impossible to crack the key. So network transmissions that are

protected by an encryption algorithm are extremely difficult to decipher.

The proposed law eases the deciphering task by forcing encryption software vendors to include a "back door" that would allow someone with a master key to decrypt all transmissions. Once back doors are programmed into security products, the master keys will become known in the hacker community, just as standard vendor-account passwords are widely distributed among computer criminals.

Not only would users lose some security under this law, they would be forced to pay for the research and development required to incorporate back doors into security products. Also, they will have to pay higher prices for U.S. technology than organizations in other countries using non-U.S. technology.

If the FBI's proposal is enacted, promising technologies that would provide greater privacy for data and voice communications will be unavailable to network users and managers in the U.S. For example, spread-spectrum wireless local-area network technology is extremely difficult to monitor; that's why it was only recently declassified by the Department of Defense.

Network users could suffer from other unexpected consequences because of the new rules. For example, statistical multiplexers typically encode portions of the data stream in a constantly changing set of data-dependent codes. In practice, it's not possible to decipher the data stream between two statistical multiplexers without having access to the muxes themselves.

If this rule took effect, would mux users have to return their

equipment because it would then become illegal? Would they find themselves in court if a police officer complained about excessive security on the multiplexed channel? Would a judge issue an injunction ordering the hapless user to decode the transmission or face contempt of court charges?

These decipherability proposals resemble the highly criticized approach of the former Soviet Union, which dictated production goals without regard for market requirements. Every U.S. telecommunications device and transmission method would have to include decipherability as a primary design factor, even if no one needed this feature.

Lawmakers and regulators are erroneously applying the mind-sets of those schooled in the human arena to technological areas. The mismatch between legislative experience and reality can cause spectacular blunders. A state legislature, for instance, once passed a law defining pi. Henceforth, this annoying number would simply be 3. Insisting that law enforcement be able to crack an encryption method or tap a communications channel is like insisting that an internal combustion engine run solely on water.

The legislators and regulators do not understand the technology involved. In an attempt to help law enforcement officials, these people may cause much greater harm for users than good for national security.

Net managers should state forcefully to their elected representatives that the proposed legislation and regulations are an unwarranted intrusion into a technological domain. ■

*Kabay is director of education for the National Computer Security Association, headquartered in Carlisle, Pa.*

## TELETOONS

BY FRANK AND TROISE

### The Future of Networking April 23, 1996

*The Nuke-Tec Corporation unsuccessfully introduces the first plutonium-powered uninterruptible power supply.*



## LETTERS

### Novell puts itself first

In response to your July 13 editorial "Novell should put customers' interests ahead of its own," I would like to say that I totally agree.

I would like to know what happened to Novell, Inc.'s claim that "NetWare 3.X will provide enterprise connectivity." Maybe I didn't hear them mutter "until we want you to upgrade to NetWare 4.X, then we're going to shift our efforts."

What's going to happen to customers, such as myself, who have NetWare 2.2 and NetWare 3.11? How will we get enterprise connectivity features such as System Fault Tolerance Level III, digital data service and security? I upgraded two NetWare 2.X servers to NetWare 3.X be-

cause NetWare 3.X would provide enterprise connectivity features. What Novell forgot to tell me was, "Oh, by the way, that's only if you upgrade NetWare 3.X to NetWare 4.0."

If Novell can't keep its word, then maybe it's time to look elsewhere for enterprise connectivity.

Robin Embry

Data processing manager  
Haas Cabinet Company, Inc.  
Sellersburg, Ind.

### Defending fixed-port hubs

Your recent feature article "The hubbub about hubs" (NW, June 1) provides buyers with a valuable guide when purchasing smart wiring hubs. However, I must take exception with the as-

(continued on page 45)

*Do you disagree with an article you've read in Network World? Write us a letter about it.*

*Hard copy should be typed, double spaced and mailed to Editor, Network World, 161 Worcester Road, Framingham, Mass. 01701 or faxed to (508) 820-3467. If you prefer, letters can be sent via MCI Mail at 390-4868 or uploaded to our Bulletin Board System. (See page 2 for BBS instructions.)*

*Letters may be edited for space and clarity.*

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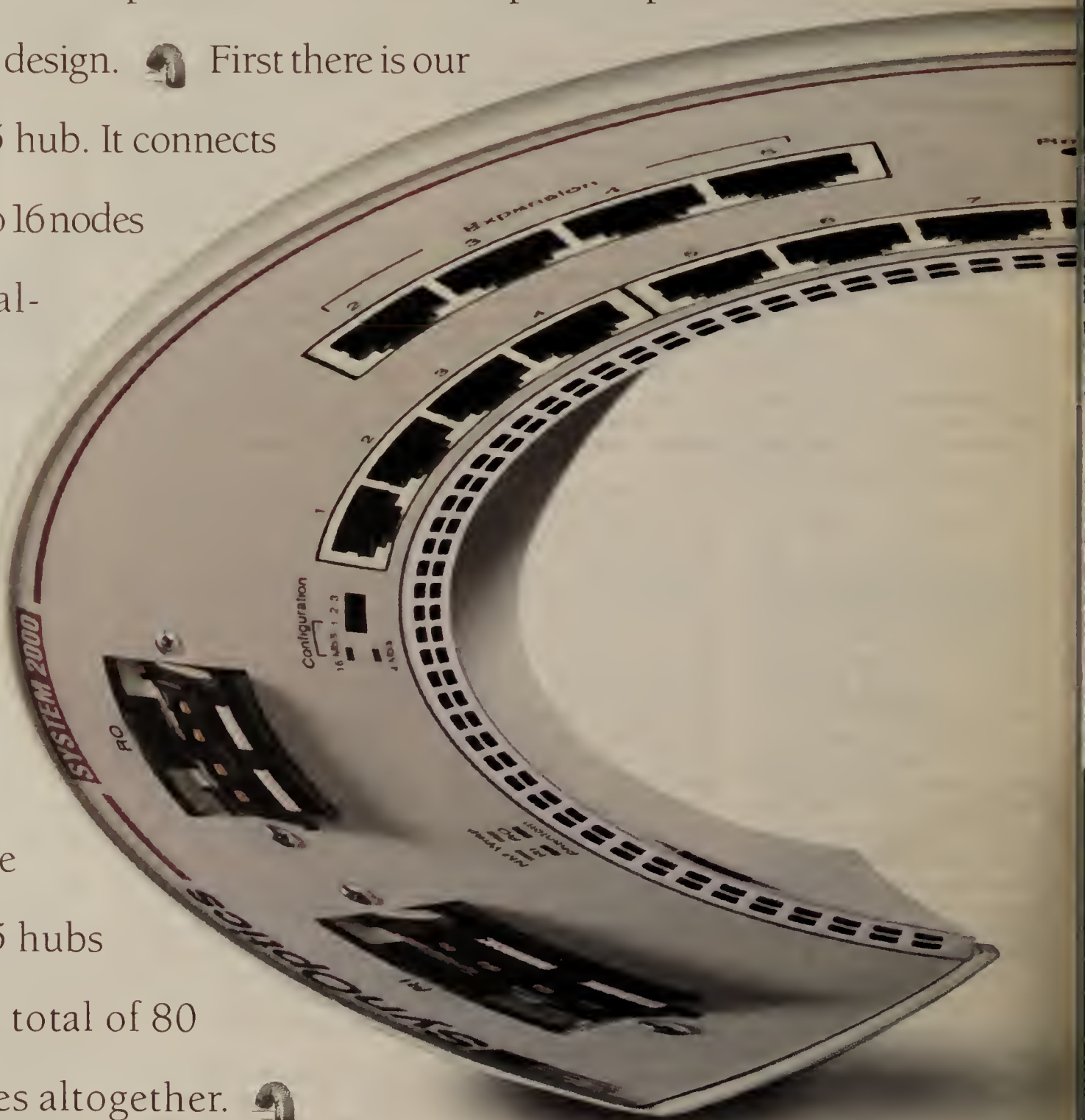
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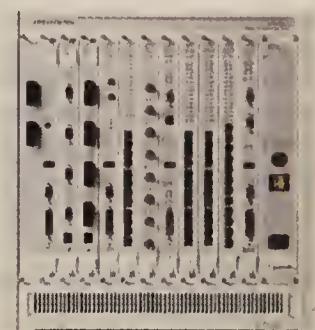
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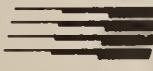
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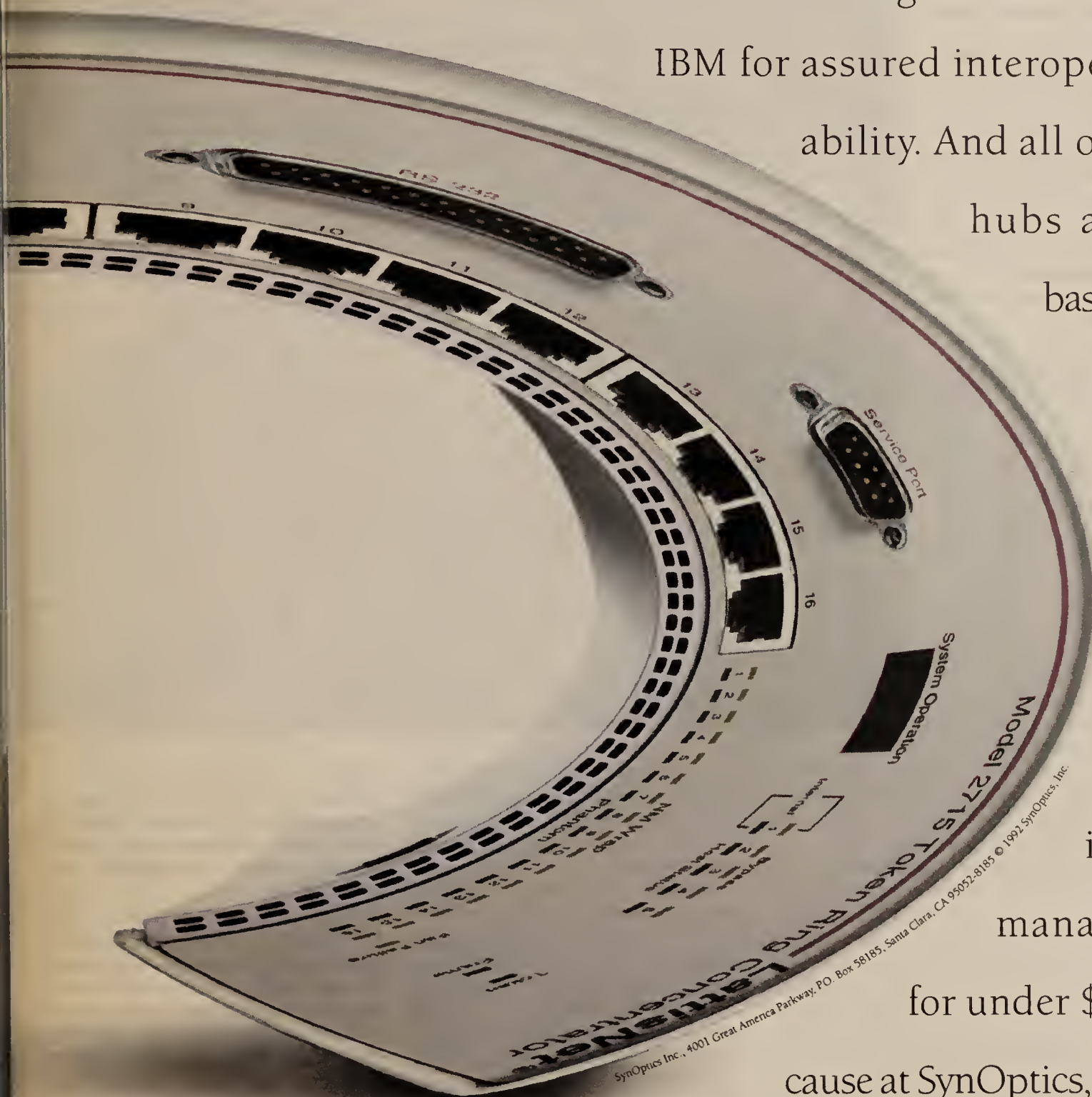
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# The network graduates

Users have been hearing for what seems like eons about all the gee-whiz applications an intelligent network can provide. They've even gotten a taste of what an intelligent network has to offer in the form of calling card, 800 and virtual private network services.

But these applications are just the tip of the iceberg. After years of carrier tutelage, intelligent networks have finally graduated and are now primed to support even more functional applications — everything from interacting with customer premises equipment to the ability to take cues from control terminals at customer sites.

In fact, early examples of these increased capabilities are now emerging. "Intelligent networks have arrived for a select number of large users," says Daniel Gonos, manager of telecommunications for Domino's Pizza, Inc.

Gonos worked with carriers to develop a unique application in which customers calling a single number are transparently routed to the closest Domino's outlet. This feat is accomplished by matching the calling party's telephone number against a list of Domino's phone numbers to find a store that has the same local exchange number, or at least a number in a neighboring local exchange.

"But for small to midsize users and large users with distributed operations, intelligent networks are not yet here," Gonos says.

Indeed, the intelligent network is still evolving. Standards for signaling and service descriptions are solidifying. Carriers with established intelligent networks are looking to provide higher levels of functionality, and those carriers without such nets are building them.

## Getting smart

Intelligent networks got their start in the 1980s when carriers busily installed thousands of miles of fiber-optic cable, along with scores of digital switches, computer databases and other intelligent network equipment. They also wrote millions of lines of software code to run the new switches and databases. The payoff for users will come in this decade as carriers focus on putting all of this technology to work.

The big three interexchange carriers — AT&T, MCI Communications Corp. and Sprint Corp. — have operational intelligent networks that provide ad-

vanced 800 services and virtual network services. A few regional Bell holding companies, such as Nynex Corp., have intelligent networks that support virtual network service.

Today, intelligent networks are being installed by several second-tier long-distance carriers, additional RBHCs and the largest cellular provider in the U.S., McCaw Cellular Communications, Inc. International carriers are also jumping on the bandwagon, while standards are moving to the point where all of these carriers are developing plans to interconnect their intelligent networks and provide integrated services to users.

This interoperability is achieved by building links between the modular components that comprise an intelligent network. The key modules include

switches called signal switching points (SSP), computer databases called signal control points (SCP) and signal transfer points (STP), which are switches that use Signaling System 7 (SS7) or some other protocol to shuttle messages between SSPs and SCPs.

Some of the carriers without intelligent network services set up calls with SS7's out-of-band signaling, which is faster than traditional inband signaling techniques. Other carriers use SS7 for call setup but use other protocols to drive their intelligent networks. For instance, MCI uses X.25 for signaling among its intelligent network elements. However, carriers will eventually tap SS7 to perform the bulk of intelligent network signaling.

Together, these intelligent network modules support a common set of functions carriers use to build services. For example, an



ILLUSTRATION ©1992 CAROL O'MALIA

SSP receiving an 800 call kicks off a process in which STPs query SCPs in order to translate the number to a switched network number so the call can be sent on its way.

Adding or subtracting functions enables carriers to put a different twist on a service. For instance, once a number has been translated, the network could check the agent status at a customer site. If all the agents are busy, the call could be sent to an alternate location.

This intelligent net design differs substantially from the design of networks 10 years ago. In older nets, call routing information was stored in individual network switches in the form of routing hierarchies.

## Switch is on

The Big Three long-haul carriers switched to this intelligent network design soon-

er than others in order to provide users with new and advanced services. To keep in step with their larger competitors, smaller interexchange carriers have built their own intelligent networks.

In the past, most of these carriers had limited centralized intelligence for specific services such as calling cards. But now midsize carriers such as Advanced Telecommunications Corp. (ATC) and Metromedia Communications Corp. have intelligent networks capable of supporting virtual network services.

ATC announced its Customer Defined Network as well as intelligent network enhancements to its calling card last May. Metromedia is planning to offer a virtual network service later this year.

ATC's and Metromedia's offerings will compete with AT&T's Optimum, MCI's Vision and Sprint's Clarity ser-

By MARK LANGNER

## Carriers' gradual installation of equipment and software instills networks with newfound intelligence.

vices. These services have similar features as high-end virtual networks, such as AT&T's Software-Defined Network, MCI's Vnet and Sprint's Virtual Private Network (VPN), but are targeted at the same midsize companies ATC and Metromedia serve.

These midsize companies require fewer advanced features and have fewer sites than users of higher end virtual network services. As a result, ATC's and Metromedia's virtual network implementations are not as sophisticated as those of AT&T, MCI and Sprint.

For instance, ATC does not offer the same type of network management terminal as AT&T, MCI and Sprint do. The larger carriers enable users of their high-end virtual net services to tap into their internal management systems in order to perform such tasks as to define 800-service call routing parameters, dynamically reconfigure the network and turn authorization codes on or off.

ATC uses a voice response unit to offer similar functions. Users punch in digits from a push-button phone in response to voice prompts. This restricts network control to mostly calling card service moves and changes at the time. "We currently don't have any plans for terminal-based network management," states Bob Finch, vice-president of engineering and development at ATC. "That capability was not at the top of the list of features our customers were looking for."

### Expanding the intelligent net

AT&T, MCI and Sprint are focusing their efforts on refining and expanding their intelligent networks.

Sprint, for example, will move VPN to its intelligent network platform in 1993. Currently, Sprint uses its intelligent network to offer such services as calling card and 800. Within VPN, Sprint stores call routing information on its central office switches, while other carriers store it on SCPs. Sprint will off-load that information to SCPs next year.

The Big Three are also looking to extend the reach of their intelligent networks into the customer premises arena. Carriers have been putting a lot of emphasis on getting customer premises equipment involved in call processing. All of the carriers are involved in this in some way — taking feeds of information from customer equipment and then having their networks act based on that information.

One application carriers are working this technology around is automatic call distribution (ACD). On a limited basis, Sprint is taking X.25 feeds over a dedicated facility from customer ACD routing tables to control 800 call routing in the network. The network has predefined triggers that, when activated, instruct the network to query the customer ACD for routing instructions.

AT&T and MCI are working on similar interfaces. In June, AT&T announced a capability, called Integrated Services Digital Network Look Ahead Interflow, that currently enables AT&T Definity private branch exchanges to route calls to an alternate location based on parameters housed in the PBX. AT&T has published a specification that will enable other vendors to

build equipment that works with the service. The feature uses the ISDN D-channel signaling to query PBXs for their status. If the PBX signals the network to reroute the call, the network will reroute from the originating switch, thus eliminating the need for the call to first be routed to the busy location.

MCI is developing what it calls Release Link Protocol (RLP), which will work similarly to Look Ahead Interflow. However, MCI will first send a call through its network to the point-of-presence (POP) nearest the terminating site. That POP will use ISDN and its D channel to query the equipment at the customer site, such as an ACD. If that equipment is busy, the terminating POP instructs the originating POP to reroute

the call to an alternative site. Without RLP, the terminating POP would act as an originating POP and attempt to pass the call to the alternative site, thus getting more POPs involved in the call routing than needed.

The CCITT Q.931 User Network Protocol for ISDN outlines a set of messages that can be used to shuttle information between customer premises equipment and the carriers' networks to support these types of applications.

In the future, applications that integrate customer premises equipment and the intelligent network will become even more involved. For instance, customers will be able to have equipment that constantly monitors the network for company-specific information, in-

*(continued on page 36)*

## Carriers in search of intelligent net standards

While it's commendable for carriers to talk about building intelligent nets using standardized components and features, the standards development scenario is foggy enough to hold them back from achieving that goal.

Standards development for intelligent networks is a combined effort of various standards bodies, including ANSI and the Consultative Committee on International Telephony and Telegraphy. There are also some industry groups that contribute to the standards-setting process.

For example, the Cellular Telecommunications Industry Association (CTIA) is working toward development of intelligent net standards for the cellular industry, while the Global Virtual Network Service (GVNS) Forum does likewise for international virtual nets.

Although both accredited standards bodies and industry forums work on standards, they are nibbling at the problem from opposite sides. The accredited standards bodies are developing standards that apply to all aspects of intelligent networks. Groups such as CTIA and the GVNS Forum can draft a proposed standard and submit it to accredited standards bodies such as CCITT or ANSI.

More often, industry forums forge agreements among members to work out kinks in a specific intelligent network technology and develop finished

specifications for implementing the technology based on draft CCITT or ANSI standards.

When carriers develop an implementation based on a draft standard, industry forums help to reverse-engineer the standard and mediate between different implementations of it that are currently in place.

International virtual networks provide a good example of this. Every carrier implemented its own version of different features. "We couldn't get the feature functionality for services we wanted [to offer using existing standards]," says Tony Alotto, Sprint Corp.'s director of network technology programs for long-distance operations, referring to the functionality of Sprint's Global Virtual Private Network. "So we jumped ahead of the standard."

Global virtual network customers suffer from this lack of feature compatibility. For example, users encounter network planning problems if they can obtain only three- to five-digit accounting codes in one country and seven- to 12-digit codes in another. The GVNS Forum was established to hash out a plan to implement features in a common manner across various carriers' intelligent networks.

Recognizing that industry forums often jump the gun on standards, CCITT last year initiated steps to have its standards ratified more quickly

than the traditional four-year period.

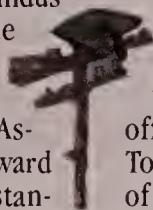
CCITT is also developing two sets of intelligent network standards. Its Q.1200 series will simply define basic intelligent network capabilities as well as how an intelligent network should operate. The Q.1200 capability standards are based on a benchmark of different services chosen by CCITT.

In addition, the group is working on a set of standards that defines the particulars of specific services so they can be offered by different carriers in a seamless manner. Examples of this are the standards for global virtual network services and universal personal telephone service, which is similar to emerging domestic personal communications service.

Standardizing intelligent network functions is not always easy or clear-cut, especially when an agreement on what can be done is hard to come by. "I don't see any real movement to standardize intelligent network applications," says Larry Bouman, senior vice-president of program management and systems planning at MCI Communications Corp. "Portions of applications will be standardized — for example, the message information required for 800-number portability."

Beyond that, Bouman says, different carriers will add proprietary functionality to make their 800 services stand out from the competition's.

— Mark Langner



(continued from page 35)

cluding whether the call is carrying voice, data or video and whether the caller, such as a company president, has more priority than others to access high-quality services such as an uncompressed voice channel.

This will usher in an era of "smart" PBXs and other smart customer premises equipment that will gather information from different portions of networks — SCPs for database information and SSPs for call processing information — and assemble it to make a decision on how to con-

"If the local exchange carrier could give you a PRI, the network could then choose the carrier on the fly," says Rod Randall, vice-president of engineering for Telcos Communications, Inc., a customer premises equipment maker that is developing a smart customer premises equipment product.

### Build your own

Carriers are also toying with the idea of letting users build custom intelligent network applications. Intelligent nets now have service-creation capabilities that

users have different needs and, often, carriers do not have building blocks available to support those needs.

"Users don't think in building blocks," says Ray Crafton, a district manager of common channel signaling for AT&T Communications, Inc. "The problem is mapping the blocks that you have to the application that the end user wants. If you take an application, often you will find it requires building blocks you do not have available yet."

So those building blocks need to be written. With each customer-initiated application, the building block library grows, moving toward an environment in which customers can create their own services and applications from terminals in their offices.

Designing new services using carrier building blocks is a concept that some customers already seem comfortable with. "We developed our StoreFinder service by taking our knowledge of a 950 capability for local toll-free service to a number of vendors and saying, 'What can you do for us?'" says Domino's Gonos ("Domino's delivers using new call routing service," *NW*, Aug. 12, 1991). An SCE would take this to the next logical step by allowing users to design services themselves rather than relying on carriers.

### The cosmic glue

While a powerful tool for linking building blocks to create applications, an SCE alone doesn't hold the diverse pieces of an intelligent network together. Rather, that is the role of SS7. Until recently, every carrier had a different implementation of SS7 or was waiting for a finished SS7 standard before implementing it.

Now the standard is all but complete. After a four-year study period, the Consultative Committee on International Telephony and Telegraphy has finally adopted a full SS7 standard that is expected to be ratified and made generally available by next spring.

However, early implementations of this CCITT SS7 standard are being used by the carriers that helped define it. The standard will set the parameters for interconnection of intelligent networks on a SS7 basis and will pave the way for intercountry intelligent network services.

Domestically, an ANSI version of SS7 has existed for some time.

Internationally, however, SS7 has been somewhat vague and has forced carriers to adopt differing implementations to overcome this. With a CCITT standard that defines interconnection methods, international carriers can bring their net-

works into alignment.

For users, this means carriers will be better able to plan and provide integrated services across network boundaries on a local, interexchange and international carrier basis, as well as across network types such as cellular and land-based. For instance, users with overseas operations could obtain services from international, interexchange, local exchange and wireless carriers, each with separate networks. These users want to have access to the same set of call processing features across all the various networks.

SS7 first gained notoriety a few years ago when nationwide implementation by Sprint decreased call setup time by 2 to 2½ seconds over the inband signaling it was using. But providing faster call setup is just one SS7 benefit. Because SS7 is an out-of-band signaling system, communications between the different network elements travel over a separate path from the call itself ("SS7: The talk of the town," *NW*, Aug. 12, 1991). This makes it possible to use SS7 to shuttle call processing data between SSPs and SCPs.

The standard interconnection methods described in CCITT's SS7 come just in time for carriers, many of which have been struggling with the issue and are now testing various interconnection methods. Many of the current in-

mission's 800-number portability ruling, which will enable users to retain their 800 numbers when switching interexchange carrier 800 services.

Interconnection of intelligent networks on an SS7 basis for basic functions, such as call setup, is the first step toward integration and is starting to occur both domestically and worldwide. Ongoing local exchange-to-interexchange carrier interconnection trials are an example of this.

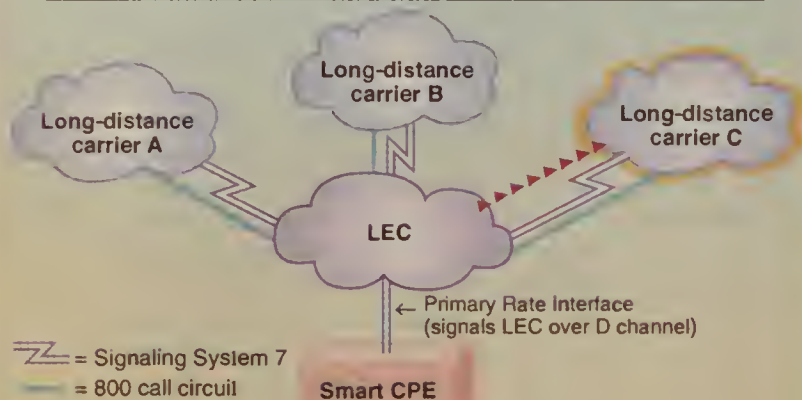
Some carriers are moving past this basic level to more advanced integration but largely on a non-standard basis. For example, the Global FON alliance, a consortium of worldwide carriers including Sprint and Cable & Wireless PLC, offers customers multilateral functionality by interconnecting the networks of partner carriers via a Northern Telecom, Inc. signaling system. The result is the ability to offer uniform advanced features, such as a single unified dialing plan and switched data service, across multiple and separate carrier networks.

### Selling intellectual property

Even with all of these formidable interconnection tasks facing them, carriers are increasingly finding that their major challenge is in selling customers on intelligent networks. As a start toward solving this problem, carriers are now attempting to sell

## Smartening up the customer premises

Figure 1



Now that networks have become intelligent, vendors can focus on developing smart customer premises equipment. Such equipment could, for example, signal a local exchange carrier (LEC) to query multiple long-distance carriers to determine which is best suited to handle an 800 call, which is long-distance carrier C in this case.

GRAPHIC BY SUSAN SLATER

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

trol the carrier network.

All this network monitoring and signaling will be carried out over ISDN or other intelligent signaling links that enable the customer premises equipment to communicate with network elements as if they were another piece of intelligent network equipment.

The monitoring capabilities of this smart equipment could grow to the point where information, such as routing directions and the cost of calls, can be gleaned from multiple carriers via intelligent signaling. This would enable users to easily choose the best or least expensive route for a call (see Figure 1, this page).

In order to pick and choose from multiple carriers' networks, users will likely want full-capacity access links to each carrier in case the smart equipment determines all traffic is better off on one network than another. But this can be costly because there would be duplicate and sometimes idle capacity to other carriers.

The situation can be avoided if local exchange carriers increase the availability of ISDN Primary Rate Interface (PRI) services. With local PRI service, all traffic flows to the local carrier with instructions on where to route each call. Users are then free to simply buy long-haul carrier services without worrying about dedicated access.

enable carriers to assemble specific functions into services and applications.

In the future, users will be able to use applications such as a service creation environment (SCE) to craft their own applications on a workstation with icon-based programming capabilities. Users could build links between on-screen icons that represent specific call processing tasks, such as collecting dialed digits or playing a recording. When completed, a file is uploaded to a carrier's service management system (SMS), which replaces the icons with the actual lines of software code needed to build the application (see Figure 2, this page).

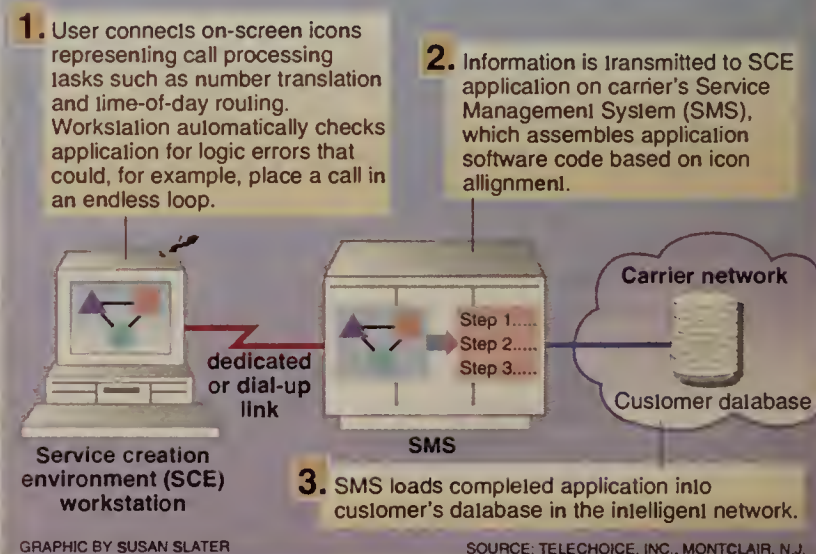
In many ways, these icons can be viewed as building blocks for developing many services or applications.

This building block approach to creating services is not new. In the mid-1970s, AT&T developed software program modules called primitives, which were basic sub-routines that allowed the carrier to develop applications for its advanced 800 services. By assembling the primitives in different fashions, AT&T service developers were able to create different applications easily.

What is new is that this concept has been extended so that these various building blocks are stand-alone modules, making new services far easier to create and launch. The problem is that

## Creating intelligent network applications

Figure 2



GRAPHIC BY SUSAN SLATER

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

terconnections are local in focus. In other words, carriers are looking to establish a customer premises equipment-to-network connection, or an interexchange-to-local exchange carrier interconnection.

This, however, is beginning to change. Carriers are counting on interconnection standards to allow easier and more ubiquitous connections with multiple carriers and customers.

Intelligent network interconnection could go a long way in helping carriers comply with the Federal Communications Com-

applications instead of technology.

The success so far has been varied. Many changes in intelligent network architectures are driven by the need to meet a user's application needs. Other changes are the result of carriers installing technology and then later marketing the applications enabled by that technology.

"At first, carriers wanted to make money off technology already installed in their networks," Domino's Gonos says. "Now carriers increasingly seem

(continued on page 45)

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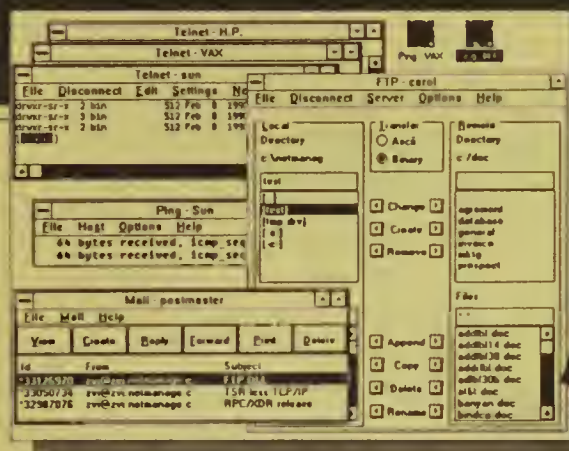
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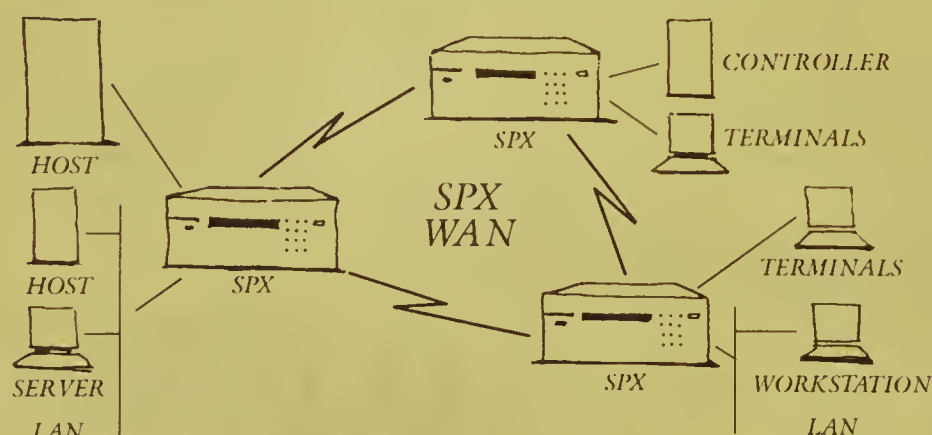
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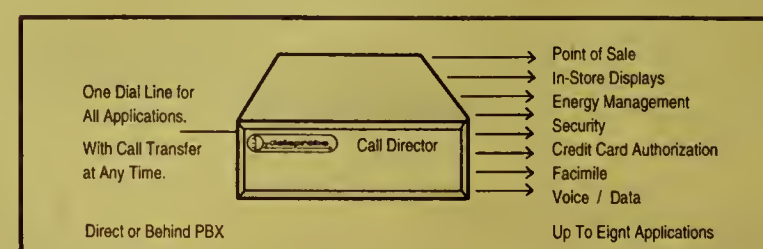
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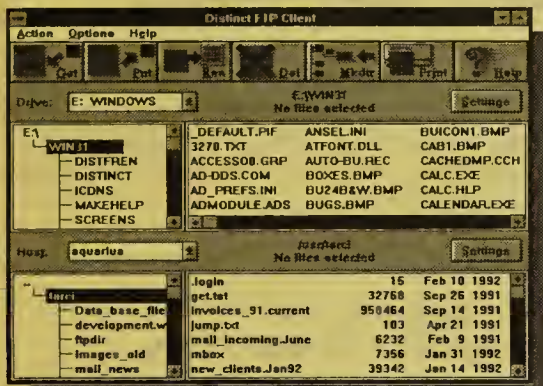
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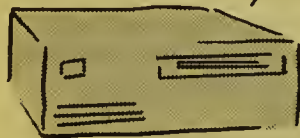
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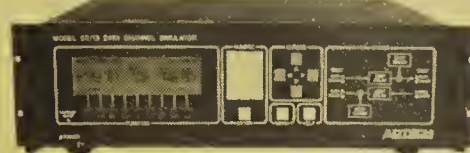
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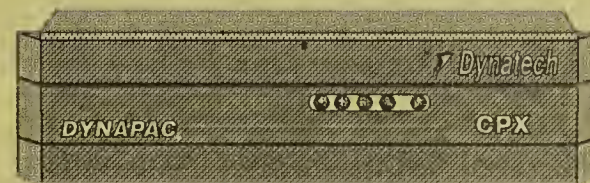
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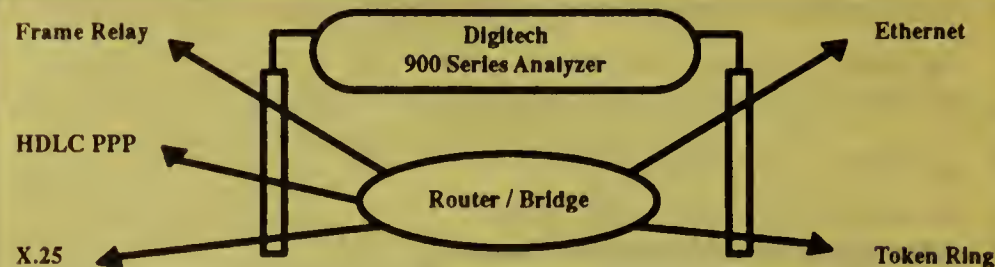
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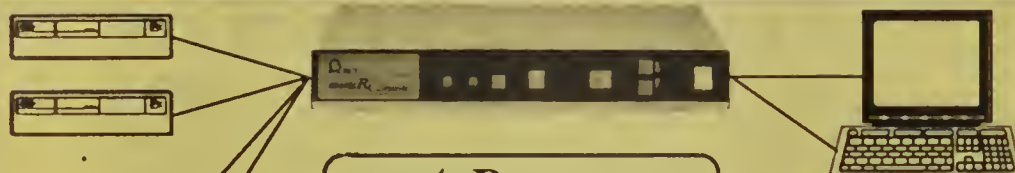
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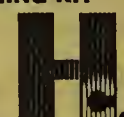


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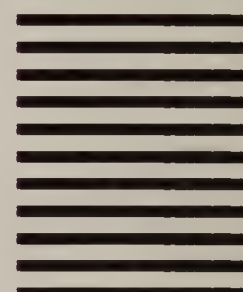
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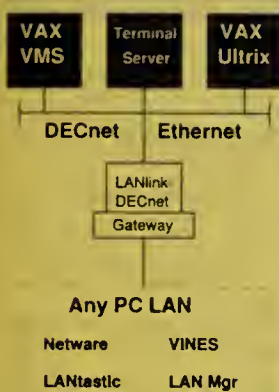
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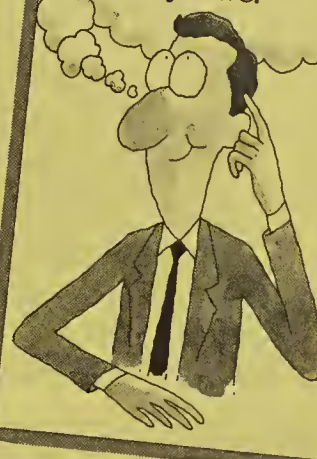
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By Paul Longoria

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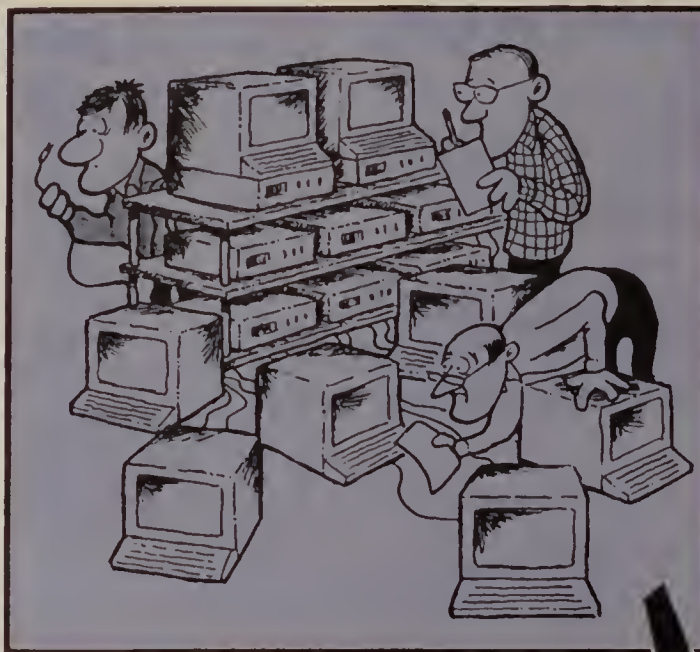
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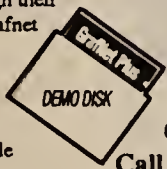
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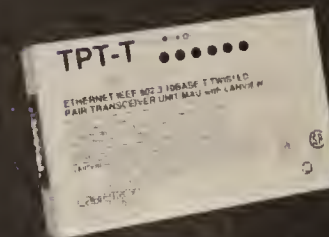
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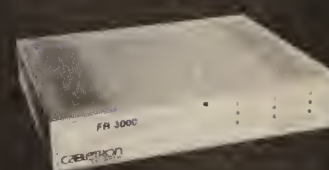
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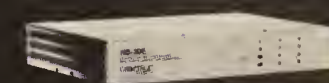
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## The network graduates

*continued from page 36*

to be developing services more in response to customer demand."

However, at this point, only the most advanced users are able to tap the leading edge of technology offered through the intelligent network. "The intelligent network needs to be brought down out of the clouds," Gonos says. "It needs to become more than just useful to major users with a thousand stations in one place."

Other users agree. "I don't want to be on the 'bleeding edge,'" says Larry Owens, network telecommunications manager for ARA Services, a Philadelphia-based provider of services such as food concessions at airports and sporting events. "Many of the features of intelligent networks are too advanced for non-telecom personnel to understand."

Because many ARA sites are

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**“Carriers have to make sure the gap between what the net can do and what users need does not get too big.”**

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▲▲▲

staffed by non-telecom personnel, Owens says it's hard to justify installing intelligent network technology at those sites.

For most leading-edge users, the problems are often not technical, but regulatory. For instance, users with many small locations find that just the installation costs of getting intelligent network interfaces to their locations is often prohibitive. Strict regulation keeps local carriers from being able to price services in a manner that would allow large users to take advantage of these capabilities en masse at an affordable rate.

For end users, the intelligent network represents a double-edged sword. Building applications around a carrier's intelligent platform may be beneficial in terms of gaining some functionality, but users lose the key ability to switch carriers at will.

"We have spent a great deal of time making sure we do not get locked into a single vendor for specific telecom applications," says Robert Vence, a vice-presi-

dent of engineering for SkyTel Corp., a paging service provider that uses intelligent network services. "I don't want to start going backwards now."

Furthermore, once an intelligent network service provider has been selected, the pressing question becomes, how do I manage all of this? Many customers have gone to great lengths to ensure a high degree of network control over their applications. But going so far as automating this control can cause problems.

Vence uses geographic network-based call routing features to allocate incoming SkyTel page request calls to specific operation centers on an area-code basis.

"Having customer premises equipment route phone calls on a dynamic basis would make it very hard for me to track problems involving my own operations," Vence says.

"If there is a problem with page requests, it may be in my operations center," he says. "I want to know which operation center to check. I can figure out which to check if I know that all the page requests from a particular area code are failing. If the network was routing calls dynamically, I would not have a way of knowing which center was causing the problem."

So users have to be careful not to let the network get too smart.

"It's OK for network capabilities to outpace customer needs," says L. Thomas Walton, president of Walton and Walton Associates, Inc. in Richmond, Va. "That's what should be happening. But the carriers have to make sure the gap between what the network can do and what users need does not get too big; it has to remain digestible." If it's not digestible, then the network may have gotten too smart.

The current focus on intelligent networks reflects the fact that, for the most part, they are new. A few years from now, most services will be founded on today's networks.

As users become more savvy and comfortable with intelligent nets, they will push carriers to expand network technology and capabilities. As new services are introduced and old ones refined, the intelligent net will become more of a reality for everyone.

In the end, it is the services, not the architectures, that matter to customers. "I don't care how the network carries and processes my calls, as long as my application works the way I need it to work," Vence says.

Users should start looking at the intelligent network as a smart resource and take advantage of it. They just need to be sure not to bite off more than they can chew. ■

## Courses teach ropes of nets

*continued from page 29*

equipment and explains the pros and cons of each in different types of net environments.

"This is the unglamorous side of networking," Lenharth said. "But we're trying to show people that they need to think through a problem before they act on it. There is no magic box that's going to solve every problem. The most important tool is in their head."

The last part of the course, like the first class, is devoted to solving students' own networking problems.

## Tips for telecom managers

*continued from page 29*

Bring in your account representative and tell him you expect his staff to keep maintenance records and you want regular, detailed reports on his product's or service's performance. Ask your salesperson to conduct research for you in new technology. Of course, his analysis will tilt toward his product, but if you get enough competing groups to provide you with their findings, you will have a solid first round of investigation done for you.

All of these methods will yield incremental savings that quickly add up to a substantial accumulation of time. Don't be surprised if you recover the equivalent of a full-time person or two.

But don't stop there. The next

Both courses are limited to eight students and have at least three instructors. The instructors all work in the interoperability lab or on the university's campus network, which consists of 37 CPUs and more than 600 network stations supporting a total of more than \$60 million worth of research, Lenharth explained.

"The lessons we've learned in the lab and in our own network come into play in the classes," he said.

The courses cost \$1,100 per student, with bulk rate discounts available. They are offered on roughly a monthly basis. For more information, contact the center at (717) 222-9100. ■

task is allocating that liberated time to critical regions of need. This means giving your staff more time to take on new projects, learn new skills or do some strategic planning for critical approaching projects.

Telecommunications organizations, like any bureaucracy, have no natural immunity to the slow, unnoticed accumulation of endless meetings and tasks that drain time from important work.

Productivity can keep its sharpest edge through your periodic reassessment of all the activities that have become routine. In an era of staff curtailments, this responsibility has reached a primary concern. ■

*Schmall is director of telecommunications at an insurance holding company.*

## Letters

*continued from page 31*

sociation of card-cage hubs with the term "high end" and the description of fixed-port hubs as "low end."

Many vendors offer sophisticated fixed-port hubs as a part of their network product offering. Fixed-port hubs with advanced management features may be "racked and stacked" along with other network components to form an intelligent wiring system that is just as expandable, flexible and manageable as card-cage solutions.

Many fixed-port hubs offer sophisticated Simple Network Management Protocol management features with extensive error counters. Some vendors offer advanced distributed management features in their fixed-port hubs. Consider Hewlett-Packard Co.'s Embedded Advanced Sampling Environment and Cabletron Systems, Inc.'s DMON options.

Fixed-port hubs may be stacked and linked together to increase the number of ports sup-

ported in the wiring closet. This solution provides true incremental growth, as opposed to buying into a chassis that may contain too many or too few slots.

As bandwidth requirements grow, a stack of fixed-port hubs can be segmented by adding a multiport bridge or router to the stack. This is in contrast to some chassis designs that have only recently added support for multiple channels and internal bridging/routing, often forcing buyers to upgrade backplanes and media and management modules at considerable cost.

When evaluating a smart wiring solution, users should consider the vendor's entire product offering, whether those products consist of a chassis and plug-in components or a series of stackable components. From this vantage point, users can better determine if the vendor's offering will meet their company's needs.

Adam Gordon  
Network consultant  
Loyola Marymount University  
Los Angeles

## Novell to unveil MHS 2.0

*continued from page 1*

out last year, this enhanced version was "redone top to bottom," Heckman said.

Some of the key features in MHS Version 2.0 come from improvements made in the NetWare Standard Message Format (SMF) application program interface (API). Through NetWare SMF, MHS supports hierarchical naming schemes and directory synchronization.

In the directory area, Novell has designed directory synchronization to be consistent with X.500 concepts and NetWare's future approach to directory searches. With this new feature, the MHS directory can be distributed and replicated across multiple servers and can be updated when servers exchange directory update messages.

Novell has also incorporated the same user interface as NetWare in MHS Version 2.0, which simplifies configuration and maintenance.

Finally, the new release broadens MHS' asynchronous communications features to include support for multiple transmission media; simplified modem definition; public data network support including T-1, X.25 and wide-area connections through a router or bridge; and link protocols, which allow faster asynchronous message transfer.

Analysts said Novell's messaging offerings are improving but are still targeted at the company's installed base.

"Even though there is plenty of opportunity selling to its customer base, if Novell wants to make its messaging products as standard as its file and print services, these offerings will eventually need to be available on other platforms and operating systems," said Jodi Mardesich, an analyst with The Burton Group's San Francisco office.

Although it is intended to offer more functionality than MHS, in its initial release, NetWare Global Messaging supports only the NetWare asynchronous and internetworking message transfer protocols that are also found in MHS. Optional support modules will follow, including components that will provide support for X.400, the Simple Mail Transfer Protocol for Unix mail and IBM's Systems Network Architecture Distribution Services.

NetWare MHS Version 2.0 will be available in October for \$295 for 10 users, \$695 for 50, \$995 for 100 and \$1,595 for 250 users. NetWare Global Messaging is shipping now and costs \$1,095 for 10 users, \$2,895 for 50, \$4,895 for 100 and \$7,295 for 250 users. ■

## Cisco boosts performance

*continued from page 1*

that is capable of sustaining the high overhead generated by packets coming off token-ring networks."

Cisco's new module far exceeds the average per-port forwarding rate of 14,000 packet/sec for competing token-ring modules, Buchanan said. In addition, the aggregate throughput of the module exceeds 66,000 packet/sec — using 32- to 42-byte packets — compared to a previous industry maximum of 25,000 packet/sec, he said.

### Direct memory access

The module, based on IBM's 16M/4M bit/sec Token-Ring mini-card, owes its performance largely to an embedded interface driver codeveloped by Cisco and IBM, which includes a 16.7-MHz bit-slice processor and direct memory access components. The two elements transfer data from the bridge/router's buffer to main memory without involving the main CPU of the AGS+. Most traditional token-ring cards utilize both local memory and the bridge/router's CPU, which slows

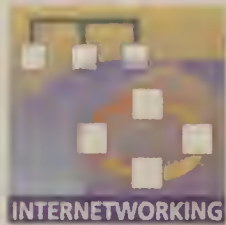
performance.

The cards, which can be configured for two or four ports, work with each other as well as with Cisco's Multiport Ethernet, Fiber Distributed Data Interface and T-3 interface cards via the bridge/router's 533M bit/sec internal cBus.

The multiport module would typically be used to connect a group of token-ring LANs housed in a building. Combined with an FDDI backbone, it can also be used to interconnect nodes across a campuswide network

or can use Cisco's serial line interface modules for wide-area connections.

The card features all of Cisco's existing IBM internetworking capabilities, including translational and source routing transparent bridging between token-ring and Ethernet LANs, a Synchronous Data Link Control-to-token ring media conversion capability and local termination of token-ring Logical Link Control 2 sessions.



It also supports all the network protocols in the vendor's existing bridge/routers, including the Transmission Control Protocol/Internet Protocol, DECnet, Internetwork Packet Exchange (IPX), Xerox Network Systems, AppleTalk, VINES, Apollo Domain and Open Systems Interconnection.

According to Stan Schatt, senior industry analyst at InfoCorp Computer Intelligence in La Jolla, Calif., the ability to segment many token rings will become increasingly important as users begin deploying enterprisewide internetworks.

"Token ring is the fastest growing area in LAN topology today because users are getting impatient with the traffic congestion encountered when connecting Ethernet LANs. As nets grow larger, users will begin moving to token ring as a way to avoid the limitations of Ethernet," Schatt said.

The Multiport Token Ring Card costs \$9,500 in a two-port configuration and \$15,000 in a four-port configuration. Both will be available in October. □

## IBM separates FEP facts, fiction

*continued from page 1*

new and emerging technologies such as frame relay, Integrated Services Digital Network and Asynchronous Transfer Mode (ATM), he said. While IBM has pledged support for these technologies in the past, it has not articulated how it will do so.

Until now.

Lorrain said his company will increase the performance of the 3745 and add support for new net services by offering a series of adapter boards that off-load as much processing as possible from the 3745's main CPU. That, along with additional system memory, is expected to result in a fourfold performance improvement.

The box's operating system,

backbones for multiprotocol transport, Lorrain said. In the past, such multiprotocol links were possible only with X.25, which meant using IBM's sluggish and complicated NCP Packet Switching Interface.

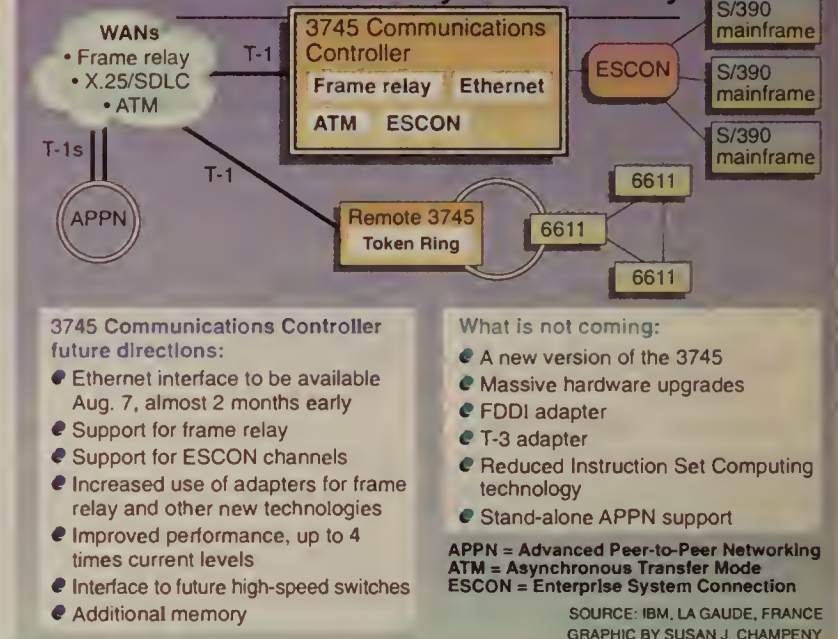
"We see the move to frame relay happening a lot quicker than many experts are predicting," Lorrain said.

The off-load technology provided in new adapters should also help ease user concerns about the 3745's performance. Some have complained that the 3745 becomes bogged down when configured for multiple T-1s.

With the move toward higher speed connections, such as ESCON and ATM, many experts have wondered if the 3745 can keep up. IBM says it can.

"We will be relying on off-

### IBM's 3745: myth vs. reality



NCP, will be enhanced to match the new boards.

"We will evolve NCP differently than we have in the past by adding enhancements incrementally through add-ons, instead of [wholesale upgrades]," Lorrain said.

Although it wasn't apparent at the time, IBM took the first step in its new direction last September when it announced an Ethernet interface for the 3745. The interface, which will ship this week, almost two months ahead of schedule, does almost all its own processing, he said.

The company will introduce similar high-performance 3745 adapters for its Enterprise System Connection (ESCON) fiber-optic channel architecture, ISDN, frame relay and ATM.

NCP Version 6, which supports the Ethernet card, is likewise shipping this week ahead of schedule. That software will also support frame relay, though frame relay adapters will not be out until later this year.

Packaging various protocols in frame relay packets will give users an effective means of using Systems Network Architecture

loading technology to support any connections that are very fast," Lorrain said.

### Exploding myths

In looking toward the future, Lorrain dispelled a few rumors about the 3745, including one that it would become an ATM or gigabit Advanced Peer-to-Peer Networking (APPN) switch. He said the 3745 will be able to link to such switches but will otherwise remain much as it is today.

He did not say if IBM will develop a separate ATM or APPN switch but did acknowledge that IBM's Paris technology is a prototype of a gigabit APPN switch.

He also conceded that IBM will not offer T-3 or Fiber Distributed Data Interface adapters for the 3745 as it had previously promised. "We looked at doing T-3 and FDDI in an off-load fashion, but ultimately, we didn't see a need for them," Lorrain said.

Additionally, he said the 3745 will neither be migrated to Reduced Instruction Set Computing-based technology nor will it support APPN functions by itself; it will continue to split those functions with a host. □

### NETWORK WORLD

161 Worcester Road  
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(508) 875-6400

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## Teleos offers up switched devices

*continued from page 5*

between \$1,300 and \$1,600 per user connection, compared to between \$800 and \$1,000 per user for a 9.6K bit/sec modem connection, said Reggie Best, vice-president of Teleos' network adapter business unit. "This is not out of the reach of what one would pay for a 9.6K [bit/sec link]," he said.

While analysts were impressed with the price/performance of the CommuterSystem, they remained skeptical about the availability of the required services.

"You get a lot of functionality

for the buck, but somebody's going to have to buy the service," said Peter Bernstein of Probe Research, Inc. in Cedar Knolls, N.J. "I don't know about you, but I don't have switched 56K [bit/sec] or BRI [lines going] to my house."

Best said Teleos has two beta users for the CommuterSystem, although he would not identify them, and is lining up six more before the product line becomes generally available in October.

The CommuterHub/PRI is priced at \$14,995. The ISDN CommuterCard/PC is tagged at \$1,795, and the SW56 CommuterCard/PC is priced at \$1,195. The SW56 card is expected to be available in the fourth quarter. □

## Devices tie LANs to frame relay

*continued from page 4*

the NV-8510 but with software and an internal DSU/CSU that supports SMDS rather than frame relay. It will support the same token-ring and Ethernet modules.

On the network side, both products will support wide-area links from 64K bit/sec to three T-1s, depending on the interface boards used, and will be able to saturate those links, Lowell said.

Pricing for the NV-8510 with one token-ring card and an internal DSU/CSU will be \$5,500, while a similarly configured NV-8530 will cost \$10,300.

Individual token-ring cards

will be priced at \$800 each. Users that already have DSU/CSUs can pay \$250 for a V.35, RS-422 or X.21 interface and eliminate the \$1,200 price of the internal DSU/CSU.

NetVantage also plans to make its WAN modules available to other vendors, such as bridge makers, that don't already have frame relay, SMDS or T-1 interfaces.

Based on the availability of Asynchronous Transfer Mode (ATM)-based services from the carriers, NetVantage plans to deliver ATM support for video and voice, in addition to data.

NetVantage's products are undergoing internal alpha testing and will enter the customer beta-testing phase in September. □

## Carriers guarded about market

*continued from page 2*

ing of the market requirements and said the main obstacle to widespread deployment of technologies such as frame relay, SMDS and ATM is lack of capital.

MCI said frame relay has been a big disappointment in terms of user demand, amounting to only a \$20 million market. The carrier added that the falling prices of voice services, brought on by tough competition in the interexchange market, are forcing the company to consider deploying ATM switches for data only.

"The cost of voice is going down, so the voice industry doesn't have the money to change the infrastructure," said Henry Sinnreich, an executive staff engineer at MCI. "We cannot afford to move quickly to ATM. The voice market is driven by software costs, not the switch fabric. Because the software is already paid for, nobody wants to change the voice switches for a long time to come."

Pointing to the soft market for frame relay, Sinnreich asked,

"And who guarantees [the market for] ATM?" However, he said, MCI is testing SMDS and ATM, and stands ready to deliver both if there is market demand.

Brent Bilger, director of product marketing at Cisco Systems, Inc. and a speaker at the conference, said, "Today's voice traffic will not be switched to ATM in this decade. But if MCI doesn't offer the service quickly, they will fall behind in the ball game."

Even AT&T representatives, who took a more upbeat stance on new services during the conference, predicted ATM will only begin to appear in carrier networks by late next year.

The prospect of ATM is making user decisions more difficult, Toth conceded. Users are questioning whether they should go to frame relay or wait for ATM. Toth also pointed out that many customers will not select a technology unless it is available globally.

AT&T is predicting that the frame relay market will reach \$800 million and the SMDS mar-

ket will reach \$200 million by 1996.

But frame relay technology was subjected to some tough criticism by experts from industry and academia who spoke at the conference. Several speakers pointed out problems with frame relay that cast doubt on whether users should ditch their X.25 networks and private lines.

And even SMDS, which garnered praise at the conference, was attacked by MCI, which said the technology is being manipulated to meet the interests of the regional Bell holding companies.

Sinnreich pointed out that SMDS, a creation of Bell Communications Research, is a subset of the 802.6 metropolitan-area network standard. "SMDS does not make use of all the 802.6 technology — only the data part," Sinnreich said.

In Europe, carriers are using metropolitan network technology to carry voice and video traffic. "The Bell operating companies would like you to buy a separate line for voice and for SMDS," Sinnreich said. "They have a vested interest." □

## Novell targets remote users

*continued from page 2*

Version 1.0, released earlier this year, supports any combination of up to four LAN or WAN interfaces, including Ethernet, token ring, LocalTalk and Arcnet. On the wide-area side, it supports X.25 and leased lines.

V.1.0 routes the Transmission Control Protocol/Internet Protocol and AppleTalk protocol over LANs, and the Internetwork Packet Exchange (IPX) across the wide-area link.

V.2.0 adds support for a Fiber Distributed Data Interface LAN interface and comes equipped with a new Novell WAN Links

V.2.0 NLM that enables the router to transport IPX, TCP/IP, AppleTalk and Open Systems Interconnection packets across X.25 or leased-line networks.

It also supports source routing and source routing transparent bridging, as well as the Routing Information Protocol and the OSI Intermediate System to Intermediate System routing protocols.

By year end, the device is also expected to support DECnet, VINES, Xerox Network Systems and the Open Shortest Path First routing protocol.

The new router comes equipped with enhanced management capabilities, which enable users to obtain local or remote monitoring capabilities from standard Simple Network Man-

agement Protocol-based management systems. Previously, all management was done on a local NetWare management console.

Version 2.0 also includes an NLM that guides users through a configuration with menus, forms and context-sensitive help, enabling users who are unfamiliar with routers to install the devices more easily.

A new Service Advertising Filter NLM reduces the amount of network traffic generated by NetWare's Service Advertising Protocol (SAP) by restricting the amount of SAP broadcasts that cross the router. In addition to lowering bandwidth usage, the filter also improves security by allowing a net administrator to

determine which resources can be viewed by users on other network segments.

Finally, the vendor's NetWare Hub Services now comes bundled with V.2.0, so users can configure a PC to serve as both a router and a low-end LAN hub capable of supporting between 36 and 60 Ethernet or token-ring nodes, depending on the number of LAN cards the PC can support.

### WAN API

In an effort to encourage third-party vendors to develop PC-based WAN interface cards for use with V.2.0, Novell has released its Wide Area Network Interface Specification, an application program interface.

Approximately 45 vendors are

already developing WAN interfaces for V.2.0 that include everything from frame relay, Switched Multimegabit Data Service to T-3, according to Navin Jain, vice-president and general manager of Novell's Internetworking Products Division.

Jain said a software-based router gives users the ability to maintain and upgrade routers more easily. Because V.2.0 is implemented as an NLM, the router software is hot-swappable. That is, users can remotely add new NLM routing features without disrupting other protocols or bringing down the network.

When the user needs higher performance, the router can be removed from a PC and reinstalled on a higher performance platform.

The big drawback of a PC-based router, however, is the performance limitations imposed by its underlying hardware platform. PCs based on the Industry Standard Architecture (ISA), Extended ISA, or Micro Channel Architecture bus and configured as NetWare routers have a maximum Ethernet packet forwarding rate of 3,000 packet/sec and a token-ring packet forwarding rate up to 8,000 packet/sec.

Jain said Novell is improving the performance of its router by optimizing the I/O cards for routing functions.

V.2.0 costs \$995 and will be available next month. The NetWare WAN Links V.2.0 will also be available next month for \$1,295 if purchased before November. After that, it will cost \$1,495. □

## New nets pose mgmt. dilemmas

*continued from page 4*

applications and hardware also affect people and the way they work. "If you don't take that into account, you'll run into problems," he said.

Morrell described a scenario where a firm may have a person who is responsible for the LAN, a person responsible for the wide-area network and a third responsible for the centralized data — each managing their own domain without coordinating the management across the environment.

When there is a problem that falls between domains, each person can rightfully say he is not accountable, but the end user is still without service. "That's a problem," he said. "Users need to have a process in place to coordinate among the groups."

Todd Dagues, director of data communications research and consulting at The Yankee Group, a market research firm in Boston, said companies with LAN internetworks are grappling with similar issues as those implementing distributed computing environments.

### Finding a solution

Rather than having territorial fights between LAN and WAN managers, many firms have begun creating new categories of management jobs, often hiring experts in one protocol or another, said Dagues, who spoke about managing internetworks at the conference. Liberty Mutual Insurance Co., for example, has created a position for an Internet Protocol addressing manager, he said.

"Managing the internetwork is really more of a people process than a technology issue," Dagues said. "The internetwork is really where the telecom, LAN and MIS departments all meet."

Deciding who will be responsible for managing internetworks as well as distributed computing environments is still being worked out, according to other analysts.

"There's been a political struggle going on," said Rosemary Cochran, a principal at Vertical Systems Group, a market research firm in Dedham, Mass.

One problem is that the existing management groups speak different languages. Whereas the WAN people tend to focus largely on the physical net, LAN administrators tend to spend more time concentrating on protocols and applications, she said.

Cochran noted that one ramification of the internetwork and distributed computing management flux is that vendors do not know to whom to pitch their wares, she added. □

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In the example to the right, Lotus 1-2-3 is running in its own 386SX PC. The window at top center is a DOS window running on a remote 486 PC under DESQview/X. Below left is a FrameMaker file running on a remote IBM RS/6000 workstation in another part of the company.



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\* DOS graphics programs currently run only on your local PC.

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